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Contents

ARTICLES

Accidents of Older Workers ... Albert Frederick Stevens ... 138
Accidents, Pedestrian, and Age ... Adelbert Ford ... 410
Annual Fall Conference of the Personnel Research Federation ... 293
Army and Navy, Rates of Promotion in ... Roy N. Anderson ... 36
Boredom in Industry ... S. Wyatt ... 161
Changing Methods in Industry ... Elton Mayo ... 326
Clerical Ability, Measurement of ... Roy N. Anderson ... 232
College Presidents, New—Class of 1929 ... Archie M. Palmer ... 393
Consistency of Operating Efficiency ... C. S. Slocombe ... 413
Constancy of Vocational Interest ... Harvey C. Lehman and Paul A. Witty ... 253
Deans of Women, Turnover Among ... Sarah M. Sturtevant, Ruth Strang and Mary Hooton ... 384
Department Store, Personnel Studies of Section Managers in a ... C. J. Ho ... 225
Employee Relations, Improving ... M. L. Putnam ... 314
Fatigue, Morale and Output ... Stuart Chase ... 333
Garment Machine Operators, Tests for ... Katharine Treat ... 19
Government's Share in the Solution of Modern Work Problems ... Frances Perkins ... 341
Grades of Labor, The ... J. O. Hopwood ... 114
Human Factor in Substation Operation, The ... Morris S. Viteles ... 81, 353
Improving Employee Relations ... M. L. Putnam ... 314
Industrial Psychology and its Development in Switzerland ... Walter J. Heller ... 435
Industrial Psychology in England, Germany and the United States ... Arthur W. Kornhauser ... 421
Industrial Research at Hawthorne ... G. A. Pennock ... 296
Intelligence of Young Printers ... Don H. Taylor ... 29
Interview in Training Salespeople, The ... Natalie Kneeland ... 47
Junior Placement, Some Problems in ... Clare Lewis ... 125
Lost Time ... J. D. Hackett ... 399
Measurement of Clerical Ability ... Roy N. Anderson ... 232
Measuring Labor Turnover ... William A. Berridge ... 197
Measuring Susceptibility to Monotony ... Lorin A. Thompson, Jr. ... 172
New College Presidents—Class of 1929, The ... Archie M. Palmer ... 393
Operating Efficiency, Consistency of ... C. S. Slocombe ... 413
Printers, Intelligence of Young ... Don H. Taylor ... 29
Pedestrian Accidents and Age ... Adelbert Ford ... 410
Personnel Relations in Business ... Franklin J. Meine ... 245

Personnel Research Federation:
  Addresses at the Dinner Meeting:
    Fatigue, Morale and Output .... Stuart Chase 333
    Government's Share in the Solution of Modern Work Problems .... Frances Perkins 341
    Psychology and Work .... John Dewey 337
  Annual Fall Conference 293
Personnel Research in the Y. M. C. A. .... Owen E. Pence 375
Personnel Studies of Section Managers in a Department Store .... C. J. Ho 225
Psychology and Work .... John Dewey 337
Rates of Promotion in the Army and Navy .... Roy N. Anderson 36
Selecting Executives .... R. O. Beckman and Michael Levine 415
Study of Work Feelings, The .... Arthur W. Kornhauser 348
Switzerland, Industrial Psychology and its Development in .... Walter J. Heller 435
Tests:
  Executives .... R. O. Beckman and Michael Levine 415
  Garment Machine Operators .... Katharine Treat 19
  Substation Operators .... Morris Viteles 81
Training Salespeople, The Interview in .... Natalie Kneeland 47
Turnover Among Deans of Women .... Sarah M. Sturtevant, Ruth Strang and Mary Hooton 384
Vocational Intentions of "Mortar Board" Seniors .... Mary Margaret Kern 266
Vocational Interest, The Constancy of .... H. C. Lehman and Paul A. Witty 253
Western Electric Company Studies:
  Improving Employee Relations .... M L. Putnam 314
  Industrial Research at Hawthorne .... G. A. Pennock 296
Work Feelings, The Study of .... Arthur W. Kornhauser 348
Y. M. C. A., Personnel Research in .... Owen E. Pence 375

NEWS NOTES

Accident Reduction in Cleveland 443
As to Personnel Research 56
American Council on Education 275
American Federation of Labor 209
American Management Association 212, 279
American Standards Association 210
Australian Institute of Industrial Psychology 210
Boston Elevated Railway 208, 442
British National Institute of Industrial Psychology 53
British Research Board Changes Title 278
Census Suggestion, 1930 54
Early Attitudes and Interests Studied 361
Eighteenth Annual Safety Congress 211
Employment Contracts, Forms of 54
Federal Advisory Committee on Education 147
Federal Board for Vocational Education 355
Fellowship Awards for Personnel Research 54

Fellowships and Other Gifts........ 148
Filene's Sons' Company: Employee Cooperation in Management........ 444
Forthcoming Meetings........ 58, 149
Gilbreth Fatigue Committee........ 444
Governmental Safety Plans........ 147
Hiring-Age Limits Investigated........ 360
Industrial Health Conservancies Laboratories........ 442
Industrial Psychology for Foremen........ 360
Industrial Relations in the Metal Trades........ 445
Industrial Relations Counselors........ 279
Industrial Scientists to Help Plan Chicago Fair........ 147
International Industrial Relations Association........ 56, 209
International Labor Relations........ 279
Journal of Social Psychology........ 443
Keeping Up with Current Research........ 147
Mental Hygiene and Industrial Psychology........ 361
Mental Hygiene Movement: Twentieth Anniversary........ 273
Minnesota's Session for Self-Appraisal........ 58
Mortar Board Personnel Program........ 56
National Committee for Mental Hygiene........ 209, 273
National Institute of Psychology........ 278
National Research Council Fellowships........ 279
New York Stock Exchange........ 361
New York University........ 212
Personal Items
    Baumgarten, Franciska........ 149
    Bergen, H. E........ 212
    Bragdon, Helen D........ 445
    Fryer, Douglas........ 212
    Hull, Clark........ 149
    Kennon, Anne Byrd........ 149
    Laird, Donald........ 59
    Lewis, Clare........ 149
    Parker, W. E........ 212
    Root, William T........ 59
    Smith, Fred C........ 59
    Salmon, Thomas William, Memorial........ 148
    Snedden, Donald........ 445
    Stein, Gertrude........ 149
    Sutherland, Arthur H........ 445
    Taylor, Don H........ 445
    Yoakum, Clarence S........ 212
Personnel Research at Stanford........ 274
Personnel Research Bureau at Vassar........ 359
Personnel Research Federation:
    Activities of Member Organizations........ 146, 207, 271, 355, 442
    Eighth Annual Fall Conference........ 207
Personnel Work at Connecticut College........ 359
Psychology Institute Incorporated........ 278
Public Employment Services Convention........ 211
Purdue-Wabash Conference........ 207
Religious Education Association Conference........ 211

Revue de la Science du Travail 54
Scholarships for the Training of Counselors 146
Smith College 58
Study of Packing, A 278
Study of Public Employment Bureaus 210
Taylor Society Postpones Spring Meeting 58
Test of Scientific Aptitude, A 275
United States Bureau of Labor Statistics 356
United States Bureau of Mines 271
United States Civil Service Commission: Forty-Sixth Annual Report 355
University Police Center, A 148
Vocational Service for Juniors 207
Women's Bureau: Work from November 1928 to November 1929 357

BOOK REVIEWS

American Engineering Council: An Engineering and Statistical Study of the Relationship of Industrial Safety and Production — Arthur Howard Sutherland 216
Anderson: Psychiatry in Industry — C. Macfie Campbell 151
Balderson: Managerial Profit Sharing — Ordway Tead 284
Bartlett: The Y. M. C. A. Executive Secretary; The Y. M. C. A. Physical Director — Richard S. Uhrbrock 448
Brewer: Cases in Administration of Guidance — Phyllis Blanchard 364
Bruere and Pugh: Profitable Personnel Practice — Edward S. Cowdrick 60
Bureau of Public Personnel Administration: Classification and Compensation Plans — Arthur H. Sutherland 213
Carver: Personnel and Labor Problems in the Packing Industry — Edward S. Cowdrick 60
Cathcart: The Human Factor in Industry — Yandell Henderson 282
Cornell: Industrial Organization and Management — Ordway Tead 281
Crawford: Incentives to Study — Arthur H. Sutherland 63
Crawford: The Choice of an Occupation — W. H. Cowley 154
Fleischman: An Outline of Careers for Women — Bessie Bunzel 61
Frolov: The Study of Conditioned Reflexes as a Foundation for Pedagogy — D. L. Zyve 282
Hackett: Labor Management — Ordway Tead 363
Hader: What'll You Do When You Grow Up? — Douglas Fryer 365
Hollingworth: Vocational Psychology and Character Analysis — Harold E. Burtt 446
Harriman: Standards and Standardization — Arthur Howard Sutherland 69
Kantor: An Outline of Social Psychology — Arthur Howard Sutherland 64
King: Today's A B C Book — Douglas Fryer 365
Kitson: How to Find the Right Vocation — Richard D. Allen 449
Kuh: Happy Hour Books — Leona C. Buchwald 450
Laidler: A History of Socialistic Thought — James H. S. Bossard 154
Lauck: New Industrial Revolution and Wages — Ordway Tead 283
Leary: Modern Psychology: Normal and Abnormal — Henry E. Garrett 68
Leese: Collective Bargaining Among Photo-Engravers in Philadelphia — J. D. Hackett 449

Lloyd-Jones: Student Personnel Work at Northwestern University.......... Karl M. Cowdery.......... 280
Lobsenz: The Older Woman in Industry.......... Amy Sturtevant Hobart.......... 364
Manning: The Job Guide for Seniors.......... Douglas Fryer.......... 365
Mellen: Foreman Training.......... Arthur Howard Sutherland.. 213
Moss: Your Mind in Action.......... Arthur Howard Sutherland.. 70
Murchison: Social Psychology.......... Arthur Howard Sutherland.. 64
National Industrial Conference Board: Supplemental Bonuses for Wage Workers, Supervisors and Executives.......... Arthur Howard Sutherland.. 213
Northcott, Sheldon, Wardropper & Urwick: Factory Organization.......... Ordway Tead.......... 281
O'Connor: Born That Way.......... Harry D. Kitson.......... 65
Patrick: What is the Mind?.......... Arthur Howard Sutherland.. 70
Pavlov: Lectures on Conditioned Reflexes.......... C. S. Yoakum.......... 150
Proceedings of the Paris Congress of Techno-Psychology.......... W. V. Bingham.......... 151
Rodger: Careers.......... Arthur Howard Sutherland.. 61
Ruckmick: University of Iowa Studies in Psychology, XI.......... Arthur Howard Sutherland.. 153
Selekman and Selekman: British Industry Today. Edward S. Cowdrick.......... 362
Soule: Wage Arbitration, Selected Cases, 1920–1924.......... Arthur Howard Sutherland.. 61
Stinchfield: The Psychology of Speech.......... Douglas Fryer.......... 216
Stinchfield: Speech Pathology with Methods in Speech Correction.......... Douglas Fryer.......... 216
Taylor: Labor Policies of the National Association of Manufacturers.......... Arthur Howard Sutherland... 213
Tead: Human Nature and Management.......... Edward S. Cowdrick.......... 215
Wiggam: Exploring Your Mind with the Psychologists.......... C. J. Ho.......... 67

BOOK REVIEWS—BRIEFER MENTION

Pages 217, 284, 366, 451

NEW BOOKS

Pages 70, 155, 219, 287, 368, 453

CURRENT PERIODICALS

Pages 75, 157, 221, 288, 370, 455

CONTRIBUTORS

Leading Articles are marked (A) and Reviews (R)

Allen, Richard D.................449 (R)
Anderson, Roy N..........36 (A), 232 (A)
Beckman, R. O....................415 (A)
Berridge, William A..............197 (A)
Bingham, Walter V................151 (R)
Blanchard, Phyllis...............364 (R)
Bossard, James H. S..............154 (R)
Buchwald, Leona C................450 (R)
Bunzel, Bessie...................61 (R)
Burtt, Harold E..................446 (R)
Campbell, C. Macfie..............151 (R)
Chase, Stuart....................333 (A)
Cowdery, Karl M..................280 (R)
Cowdrick, Edward S
60 (R), 215 (R), 362 (R)
Cowley, W. H.....................154 (R)
Dewey, John......................337 (A)
Ford, Adelbert...................410 (A)
Fryer, Douglas...........216 (R), 365 (R)
Garrett, Henry E.................68 (R)
Hackett, J. D............399 (A), 449 (R)
Heller, Walter V.................435 (A)
Henderson, Yandell...............282 (R)
Ho, C. J.................67 (R), 225 (A)
Hobart, Amy Sturtevant...........364 (R)
Hooton, Mary.....................384 (A)
Hopwood, J. O....................114 (A)
Kern, Mary Margaret..............266 (A)
Kitson, Harry D..................65 (R)
Kneeland, Natalie................47 (A)
Kornhauser, Arthur W....348 (A), 421 (A)
Lehman, Harvey C.................253 (A)
Levine, Michael..................415 (A)
Lewis, Clare.....................125 (A)
Mayo, Elton......................326 (A)
Meine, Franklin J.................245 (A)
Palmer, Archie M.................393 (A)
Pence, Owen E....................375 (A)
Pennock, G. A....................296 (A)
Perkins, Frances.................341 (A)
Putnam, M. L.....................314 (A)
Slocombe, C. S...................413 (A)
Stevens, Albert Frederick........138 (A)
Strang, Ruth.....................384 (A)
Sturtevant, Sarah M..............384 (A)
Sutherland, Arthur Howard........61 (R),
63 (R), 64 (R), 69 (R), 70 (R),
153 (R), 213 (R), 216 (R)
Taylor, Don H....................29 (A)
Tead, Ordway
281 (R), 283 (R), 284 (R), 363 (R)
Thompson, Lorin A. Jr............172 (A)
Treat, Katharine.................19 (A)
Uhrbrock, Richard S..............448 (R)
Viteles, Morris S.................81 (A)
Walther, Leon....................1 (A)
Witty, Paul A....................253 (A)
Wyatt, S.........................161 (A)
Yoakum, C. S.....................150 (R)
Zyve, D. L.......................282 (R)

Technopsychology in a Swiss Industry

By Léon Walther, *Institut J. J. Rousseau, Geneva*

(With the coöperation of Gertrude Ehinger and Eric D. Bovet)

Before the War, Léon Walther was a professor of history in Russia. The foundations of his knowledge of industrial psychology were laid during a five-year period following the revolution, when he worked at the bench in a Swiss factory. Here he carefully observed his own and his fellow-laborers' processes of learning and acts of skill, the tools and machines at their disposal, arrangement of parts on the assembly bench, flow of work through the shop, effects of lighting, processes of supervision, and other influences causing variations in output and in satisfactions of the workers. He also read widely about factory organization, scientific management, and the psychology of industry.

Later, as a member of the staff of the Institut J. J. Rousseau, he made investigations at the request of the management of several factories, which resulted in simplification of work and reduction of fatigue, as reported in his volume on Technopsychology of Labor[1]*. More recent studies in an industry manufacturing certain food products are here described.*

This paper describes the difficulties, aims, methods, and results of applying psychological principles and techniques in a century-old factory in Switzerland. The problems were those of personnel classification and placement, simplification of work through time and motion studies, reduction of fatigue, and increase of output without speeding up the workers. The difficulties were (1) the apparent impossibility of introducing improvements, so skillful seemed the workers and so well organized the plant; (2) many workers were beyond the age when habits are readily modified, forty per cent being between 40 and 60 years old; (3) the employees were as well paid as others similarly employed: they were, therefore, without the usual incentive to coöperate in plans for reorganization.

About 230 women workers in 11 departments were studied. They were largely engaged in machine tending or in such manual work as wrapping and packing. Five dexterity tests were used: Dotting (Binet and Vaschide), Tapping, Bead-stringing (Descoeudres), Paper-cutting (Claparède and Walther), and Disk-setting (Walther). Test results were validated by comparison with foremen's ratings,

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[1] Léon Walther, *La technopsychologie du travail industriel.* Neuchâtel and Paris, Delachaux et Niestlé S. A. 1926. Pp. xi + 235.

THE PERSONNEL JOURNAL, VOL. VIII, NO. 1

the correlations ranging from .10 to 1.00; median correlation, .80. Compared with norms secured by the *Institut J. J. Rousseau*, average dexterity was 13.4 per cent below that of the adult population of Geneva. Classification by age groups, however, made evident that this was due to the predominance of older individuals.

Two functions of time-study are illustrated: to furnish the starting point for analysis and simplification of tasks; and, later, to establish standards. It is contended that the average or typical worker should be studied rather than the exceptional worker. But how is it possible to decide who is the worker of average ability, since it is unsafe to resort to records of individual output made previous to the studies and the subsequent improvements in technique and training? This dilemma which has puzzled many industrial engineers was solved by reference to the dexterity test scores, which furnished a suitable means of determining which was the average worker on each job, for study.

Tables of percentile scores permitted comparisons of departments as well as individuals. The psychological survey having shown that the age of the workers accounted for a relatively low dexterity rating, various aids to improvement and to conservation of the workers were employed: rest periods, linked movements, automatized movements, variety in work, reorganization of flow of work, and changes in belt-conveyors and work tables to meet the requirements of comfort, convenience and ease of movement.

Changes resulting in better placement and training, improved working conditions, and an increased output of from 30 to 40 per cent without speeding up, are reported.

THE study we are presenting to readers of the Personnel Journal has peculiar interest in that it describes the application of psychology to an organization which has been in existence for more than a hundred years. Obstacles to the introduction of changes were of both a material and psychological nature. It is all the more interesting to see industrial psychology succeed under such unfavorable conditions.

INITIAL DIFFICULTIES AND PROBLEMS

As soon as we began to investigate working conditions at the factory in question, we encountered three main obstacles. The first was that the firm in its methods of work was following traditions which were the result of the thought and experiment of generations which undoubtedly had produced a very well planned organization. While visiting different departments and observing the work of the employees, we often wondered in what way, if any, we could further increase their efficiency. What impressed us most was the almost perfect occupational movements of the women workers, the result of selection and improvement passed on from generation to generation. It was only by proceeding systematically in our psychological analysis, which will be described later, that we were able to introduce noticeable improvements in the operation of the factory.

The second difficulty lay in the advanced age of the workers. Table 1, based on data from ten departments, clearly illustrates the situation.

Twenty per cent of the workers were between 41 and 45, which are critical years, unfavorable to any change of habit. The age of forty may be taken as about the limit when an individual is still readily able to adapt himself to new conditions. Sixty per cent of the personnel were between 16 and 40 years of age; and forty per cent between 40 and 60. Although the younger element predominated, the large proportion of older workers presented a serious difficulty because of their unwillingness to coöperate in any attempt to modify traditional methods of work.

The third difficulty was the absence of incentive to employee coöperation. Most European manufacturers try to find a solution to the wage problem in the standard of living. Switzerland, a small country, possesses no raw materials and its principal industries are forced to export their products. A protective tariff aggravates the situation by maintaining a high cost of living. The manufacturer thinks he can overcome his difficulties by placing a limit on wage increases. In the factory in which we worked the level of wages had reached or even surpassed local standards. Under such circumstances the workers were not directly interested in reorganization, a serious obstacle to the techno-psychological solution of such problems. Techno-psychology is not supposed to resolve the conflict between capital and labor; it is defined as a science aiming to apply psychology to the technique of human labor. By this definition its field and its limits are clearly determined. Psychological consequences affecting human relations as a result of the contact between labor and capital are subject matter of a different discipline: namely, *social* psychology applied to economics. The *techno*-psychologist tries to keep a neutral position, and to restrict his activities to the purely technical domain. We believe that only on this condition will his technical advice be acceptable to both parties.

TABLE 1

Proportions of women employees in different age groups

AGE	PER CENT
16–20	1
21–25	10
26–30	13
31–35	19
36–40	17
41–45	20
46–50	15
51–55	4
56–60	1

These few introductory remarks as to the conditions under which we had to undertake to work, lead us back to the method used to reorganize the factory in question.

Four problems, as revealed by a study of working conditions in different departments, confronted us. It was necessary to make:

First, a survey of the level of dexterity of the personnel. This was undertaken not so much with a view to occupational selection for no one could be dismissed or hired; but rather to find out in how far each was occupying the place best suited to him. Analyzing the various kinds of work in different departments, we could establish the degree of motor dexterity required. Hand work needed much dexterity, machine work much less.

Second, a careful study of the operatives' material environment while at work. We wished to learn whether or not seats, tables, and equipment in general met the physical and psychological requirements of work.

Third, a time and motion study. As previously mentioned, we needed to make but few changes in the women's motions; yet the changes we were compelled to make were typical. They will be mentioned later.

Fourth, a study of occupational fatigue and its elimination in so far as possible.

In this article, we shall confine ourselves to an analysis of those problems which have a theoretical as well as a practical value. We shall first describe the survey of a manufacturing plant from the point of view of its workers' manual dexterity, as made with techno-psychological methods which will demonstrate the value of tests in this field. Secondly, we shall see what contribution tests can make to the important subject of time and motion study. Finally, concerning the workers' material environment and their fatigue, we shall give a few concrete instances in which reorganization has resulted in a marked increase in efficiency, thanks to the application of certain psychological laws.

TESTS USED IN THE SURVEY OF OCCUPATIONAL SKILLS

We began our investigation by measuring the motor abilities of all women workers of the departments selected for reorganization. There were about 230 women to whom we administered for that purpose a psychological examination, consisting of five motor tests: dotting, tapping, stringing beads, cutting, disk setting. They have been described from time to time in the *Archives de Psychologie.* (Vol. XIX, 1925, No. 74, p. 166; vol. XXI, 1928, No. 81, p. 5).

The test technique is as follows:

1. DOTTING (Binet and Vaschide).

Materials. Two sheets of paper 20 cm. square. A pattern of one hundred squares of 1 sq. cm. each is printed in the center. A round, blue pencil (Faber) of white wood. A stop-watch measuring fifths of a second.

Procedure. The subject is seated at a table. The sheet is placed before him, and he is given the pencil which he must hold firmly in his right hand. The examiner says: "We are going to examine the speed of your movements. Make a dot in each square as quickly as you can. Begin with this square (pointing to the first square in the left top corner). When you reach this one (pointing to the right top square) pass to the one just below it, and make the second row from right to left. For the third row go from left to right again, and so on, back and forth down to the last square. Take care to make only one dot in each square, and not to skip any. Hold the sheet firmly with your left hand, so it will not slip. Start when I say: 'Go!' Do you understand?"

The examiner starts his stop-watch when the first dot is made, and stops it at the end of the test.

Same procedure for the left hand.

2. TAPPING.

Materials. A piece of white paper about 20 cm. square. The same Faber pencil.

Procedure. "Make dots on this paper with this pencil as fast as you can. Put them anywhere you like, but just remember that I shall have to count them afterwards, and so try not to put two dots in the same place. Keep your elbow firmly on the table. Start when I say 'Go,' and stop when I say 'Stop!'."

Allow six seconds for the right hand, and six seconds for the left hand.

Count the number of dots.

3. STRINGING BEADS (Descoeudres).

Materials. Thirty glass beads of the same color, cylindrical sections of glass tubing 4 mm. inside diameter and about 8 mm. long. A piece of string, 28 cm. long, with a colored bead at one end, and threaded with a dull-pointed embroidery needle about 5 cm. long.

Procedure. "String these beads as fast as you can, holding the needle in the right hand. Pick up the beads one at a time, with the left hand. String four beads on the needle, slide them to the end of the thread, then take four more beads on the needle, and slide them down the thread, and so on up to the last, as fast as possible." Do not let the subject rest his hand on the table.

The examiner should have a few additional beads at hand for replacing any which may be dropped. Record the length of time taken.

4. PAPER CUTTING (Claparède and Walther).

Materials. A pair of scissors. A sheet of heavy paper, 50 cm. long, on which are printed three black bands, each 6.5 mm. in width. One of these makes a wavy path; the other two are Greek designs, in which the bands meet at right angles. Each bend or section of a given length is numbered for convenience in scoring.

Procedure. "Cut along these lines as fast as you can, without getting off the black. Start when I say 'Go!', and stop when I say 'Stop!'."

Twenty seconds is allowed for each line, starting with the wavy one.

The examiner counts the number of sections cut on each line and adds together the three scores. Each mistake, consisting of cutting through the white (not simply cutting *into* the white, but shortening the distance by cutting *across* the white) counts as an error and is substracted from the total number cut.

5. DISK SETTING (Walther).

Materials. Two pieces of cardboard 30 cm. square, in which 41 holes, 25 mm. in diameter have been cut. The depth of the holes in board A is 2.5 mm., and in board B, 5 mm. Forty-one cylindrical wooden disks like checkers, 23 mm. in diameter and 10 mm. thick. (See fig. 1.) Two or three additional disks should be at hand in case any are dropped.

Procedure. Before each trial, the disks are in the holes of board A. They are to be transferred from board A into the holes of board B as fast as possible. This is done three times: once with the right hand (board A is placed to the left of board B); once with the left hand (board A is on the right); once with both hands, each hand taking only one disk at a time (board A is again placed to the left of board B). The disks may be quickly transferred back to board A simply by placing the two boards together and inverting them.

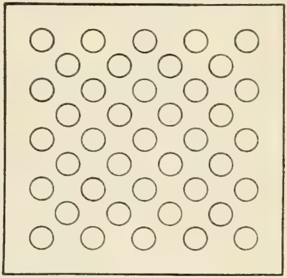

FIG. 1. SHOWING RELATIVE POSITION OF HOLES IN DISK-SETTING BOARD. REDUCED TO ONE TWENTY-THIRD ACTUAL SIZE

The time required for each trial is recorded.

The order in which the disks are placed does not affect the score, but it is interesting, nevertheless, to note individual differences in this respect as indicative of differences in characteristic traits: whether, for example work is done with system or haphazardly.

VALIDATING THE TESTS

The diagnostic value of our five motor tests had to be determined. Two procedures were possible: (1) a comparison of the workers' rank in the psychological examination with their rank in output in the factory could be made; and (2) the correlation between the result of each test and the rating of the workers by the foreman could be determined. When a large number of workers is involved, it is impossible to compare their respective outputs, for the types of work they have to perform are too varied, even within a single department. It is though, relatively easy to find jobs at which limited numbers of workers are engaged in similar kinds of work. A comparison between the results of the tests and output rating will then give very satisfactory results, as we have stated elsewhere.[1]

TABLE 2

Employees' scores in five psychological tests of motor dexterity correlated with supervisors' ratings

FOREWOMEN	CORRELATIONS	PROBABLE ERROR
Brod	1.00	.00
Hod	.93	.02
Ross	.91	.03
Jeanm	.90	.02
Chab	.89	.04
Meis	.80	.05
Jeanj	.80	.06
Mos	.70	.07
Pri	.46	.10
Barb	.40	.15
Rol	.10	.25

The second basis on which the tests may be validated,—the foreman's estimate of the workers,—has also very great disadvantages which have been stressed by authors on vocational selection. To mention only one of the obstacles to such comparison: frequent changes among the personnel prevent the foreman from knowing his workers well.

We were fortunate in finding that the managerial staff as well as the operatives had been employed, with very few exceptions, for at least eight years (maximum, 30 years), which enabled the foremen to know their workers very well. This fact partially explains the high correlations between the results of our psychological examination and the supervisors' ratings of their workers.

The two supervisors Barb. and Rol., whose ratings show low correlation with the test scores, are young forewomen, who have supervised their departments for two years only, and do not yet know their workers thoroughly well. Pri., who had been the head of her department for 15 years, had to be relieved of her duties because of inefficiency and assigned to other work. This may explain the low correlation between her estimates and the test scores.

As a whole, our results demonstrate convincingly the high diagnostic value of the tests.

It may be useful to explain our procedures with our five tests. They were given in the following sequence: Disk-setting, cutting, stringing beads, dotting, tapping. Two hundred and thirty women workers were tested. For each test we drew an ogive frequency curve, and determined the percentile score of each worker. As an index of the degree of manual dexterity of each worker, we took the arithmetical average of her percentiles in the five tests. We became convinced that the average of the percentiles in the five tests gave a more accurate picture than any single test. How can this be explained? We hesitate to answer. Is it because the subject is not sufficiently constant in his reactions to give a true picture of himself in a single short examination? Or is it because a series of tests gives a picture of a mosaic of general or special aptitudes, which better distinguishes the personality both as to intelligence and trade dexterity?[2] Whatever the reason, experience repeatedly shows the advantage of using a series of tests, whether for examining general intelligence (see Descoeudres, "Exploration de quelques tests d'intelligence." *Archives de Psychologie*, vol. XI, 1911), or for the diagnosis of motor abilities. The correlations between the forewomen's ratings and the ranks given to the workers by our tests confirm this statement. Table 3 shows that in every department the highest correlation is obtained by taking the arithmetical average of the percentiles of the five tests.

But the diagnostic value of the tests is not confined to classification of the personnel within a plant; it has a much wider significance than is at first apparent. Psychological measurement can guide us throughout. It helps us, first, to compare the general level of dexterity of a plant's employees with that in other factories, even though the output of competitive firms is not known. This is possible if we have not only standards of ability based upon motor tests applied to workers of the company, in other words, tables of norms for our own factory, but also standards established by testing some other similar population. We should be able to compare the motor or intellectual level of our plant with the level of the surrounding population or with a population living under similar conditions. In order to do this, we ought to give our psychological examinations not only to the workers in our factory, but also to a random sampling, a cross-section of the population in a region not far from our plant. The only restriction is, not to mix a town and a country population, nor persons of both sexes, nor children and adults.

TABLE 3

Correlation of scores on separate tests with supervisor's ratings

TESTS	FOREWOMEN						
	Chab.	Hod.	Ro[illegible].	Meis.	Jeanm.	Jeanj.	Brod.
1. Disks	.57	.67	.77	.60	.73	.70	.56
2. Cutting	.52	.59	.84	.64	.61	.60	−.24
3. Beads	.87	.49	.57	.51	.64	43	.37
4. Dotting	.31	.70	.64	.42	.57	.68	.83
5. Tapping	.20	.66	.44	.68	.31	71	.93
Average percentiles of the 5 tests	.89	.93	.91	.80	.90	.80	1.00

The *Institut J. J. Rousseau*, with the coöperation of the psychological laboratory of the University, has determined such tables of norms for the population of the city of Geneva. They have been published by Mme. H. Antipoff in the *Archives de Psychologie* (Vol. XXI, No. 81, p. 11.). Since the women workers of our factory live in an urban district we thought it permissible to use for comparisons these norms of the *Institut J. J. Rousseau* in our analysis.

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[2] W. Stern, *Personnalité et tests*, Journal de Psychologie, Vol. XXV, pp. 5–18.

Comparison of the norms obtained in our factory with those for the population of Geneva (see table 4), impressed us with the fact that the average dexterity level of our workers was 13.4 per cent lower than that of the adult population of Geneva.

TABLE 4

Comparison of norms for the population of Geneva with those for this factory

PERCENTILES	DISKS (TIME)		CUTTING (SCORE)		BEADS (TIME)		DOTTING (TIME)		TAPPING (SCORE)	
	Geneva	Plant	Geneva	Plant	Geneva	Plant	Geneva	Plant	Geneva	Plant
75	114	113.5	44	33	54	51	55	67	90	70
50	118	120	39	28.5	62	57	63	75	82	58
25	130	128	34	24	66	62	70	84	76	46.5
Comparison of medians.	−2 per cent		−27 per cent		+8 per cent		−16 per cent		−30 per cent	

TABLE 5

Scores for three age groups

(A = 22 to 32 years; B = 33 to 41; C = 42 to 51)

PERCENTILES	DISKS (TIME)			CUTTING (SCORE)			BEADS (TIME)			DOTTING (TIME)			TAPPING (SCORE)		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
25	120	127	131	27	23	24	59	60	68	77	84	91	49	47	43
50	115	120	126	31	27	28	54	54	61	71	76	81	64	58	57
75	110	113	117	34.5	32	33	49	51	55	65	66	72	72	67	70

Here again the percentile scores enabled us to trace the reason for the lower dexterity ranking of our workers. To do this we classified our women into three groups, according to age. The first group included workers from 22 to 32 years of age; the second those from 33 to 41; and the third from 42 to 51. For each group and for each one of our five tests we made a Galton ogive or frequency curve and a table of percentiles, which made it possible to compare the various groups. These figures showed that the first group (22 to 32 years) was superior to the two other groups in every test. The superiority of the second group (33 to 41 years) over the third appeared clearly in the disks, beads, and dotting tests, but not in the other two (table 5).

We have thus been convinced that with our workers, age has an unfavorable influence upon success in dexterity tests. More detailed research[3] makes us conclude that motor abilities begin to weaken between the ages of 27 and 33 years. This corresponds with findings of American psychologists in the examination of recruits for the World War (Yerkes, *Psychological Examining in the U. S. Army,* p. 814). We insert here the two figures, the American and our own (figs. 2 and 3).

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[3] Gertrude Ehinger, *Age and Decline of Aptitudes.* Archives de Psychologie, 1927, Vol. XX, pp. 318–323.

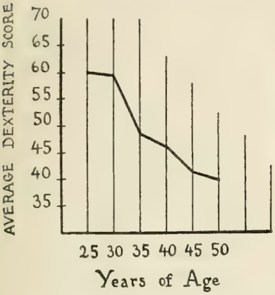

Fig. 2. Relation of Age to Motor Dexterity

Average percentiles of the five tests given by the Institut J. J. Rousseau to a sampling of the population of Geneva.

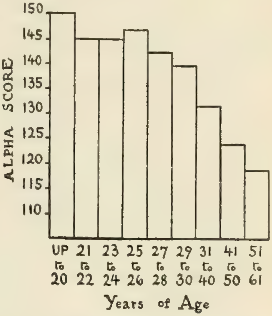

Fig. 3. Relation of Age to Mental Alertness. Median Alpha Scores, Reported by Yerkes

In short, the percentile scores have helped us to determine the grade of motor dexterity of the manual workers in our factory, and to find in their age the cause of its inferiority. This discovery has been our guide in our plan of reorganization; to conserve at any cost and to the limit of our knowledge the lessened strength that remained to the older women who constitute such an important part of the personnel of our plant. But, before we describe what we have done, we must stop to consider a question closely related to the previous one: How to set standards of performance for the various jobs in the factory?

VALUE OF TESTS IN STUDYING WORKERS' TASKS

Here again, in studying the workers' tasks, the tests and norms expressed in percentiles will help us.

As is well known, the worker's task is set as the result of a study of the time necessary to complete a given job. Indeed, timing is for many engineers and manufacturers still the only way by which a concern can put its internal organization *en rapport* with the worker.[4] We have demonstrated on a previous occasion how inadequate this method is.

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[4] Léon Walther, *La technopsychologie du travail industriel,* pp. 134–150.

In order to get real assistance from time studies in organizing the workers' tasks, the limits of their applicability must be clearly shown. From the position of first importance assigned to them by Taylor's followers, they must be reduced to a secondary rôle. Within such limits time studies have a double function.

First, in beginning a general survey of work in a department, time studies must be made, not to set standard times, but more specifically, to analyse the jobs and to study the conditions of work. Time studies reveal whether work done in different places with the same tools, etc., results in the same or different output. Time studies show up such inequalities, and incite the experimenter to discover causes. This is the first function.

Next, after the occupational movements of the workers have been submitted to a strict examination in the light of physiological and psychological laws of rhythm, automatism, fatigue, etc., we can undertake the final time study. It will simply be the recording of a completed study. In this rôle it might just as well be replaced by motion pictures. This is the second phase of time study.

In these two functions only will time studies prove helpful in organizing human labor, *i.e.*, in determining the worker's task.

But time studies present another problem, quite as important as the problem of their limitations. This second problem is, "Which worker is to be timed?" While it is agreed that for studying expert motions, timing is to be done on workers whose movements are as nearly perfect as possible, ("classic," to use the French term) opinions differ as to who is to be timed for setting rates. Taylor claims that an excellent worker of first calibre, who works fast, must be chosen as standard. Merrick seems willing to make a concession. The best and the easiest way, he says, is to make observations always on a first class but not extraordinarily skillful worker. Michel agrees with him when he says that there is no reason to take a good worker for time study. Other authors, on the contrary, Fahr for instance, insist that time studies be taken on all workers of the plant, and never on a single one, particularly not on the best one.

But, the notion of an "excellent," or a "well trained," or a "not very well trained" worker is relative. Even the procedure suggested by Fahr, that of classifying the workers of a plant according to their occupational qualifications (index of occupational skill), would have value at most for a single concern. Within the same industry, standards might be higher or lower in two different factories. If Fahr's index of occupational skill is taken as a criterion for a single plant, the goal is missed, because Fahr sets this index according to the piece-rate earnings of the workers, and because the jobs on which these piece-rates have been based are not comparable. The various jobs differ from each other in difficulty. There are, even in a single department, very few operations that are exactly of the same sort. Standard tasks set for various jobs in the same department may be entirely arbitrary. So there is no objective basis for the "index of occupational skill." We are very far, as is obvious, from the hopes of Taylor and his followers regarding the possibility of fixing "universal" norms for all industries of the same kind.

We believe that the tests, provided they are established on percentile bases, can settle, at least to some extent, the differences of opinion as to which worker should be timed.

First of all, we believe that it is a mere principle of social justice to determine the rates on an *average* worker. But one should have a really objective criterion as to who is the average worker. The tables of percentile norms established on the one hand by use of well proved tests, and on the other hand on a population homogeneous in nationality, location, sex and age, can do this for us. In these tables we shall easily find this *average worker* for whom so many authors have been looking, in order to justify the use of time studies in setting daily tasks or job rates.

Using tables similar to those above mentioned, we studied the duration of each separate job as performed by the worker who had scored closest to the median or fiftieth percentile. We then examined this worker very carefully, as to his material environment, his occupational motions, and his work curve. We did not increase his speed; we merely tried to be sure that his tempo was kept as constant as possible throughout the day's work. We guarded against everything that could disturb his natural rhythm. The time required by such an average worker was then considered as normal time, and his output as a standard task. The workers whose percentiles were above the average could easily exceed the norm thus established, and thus increase their wages. Those in the lower quartiles were assigned as far as possible to other jobs, particularly to time work, to indirect labor, where they could earn if not high, at least reasonable, wages.

The same scores based upon our five motor tests have enabled us to get a picture of the general dexterity level of the various departments. Table 6 gives a general idea of dexterity in all departments included in this psychological survey. One column shows dexterity figures based on the average of the percentiles in the five tests, obtained by the workers in each department. Another column gives the corresponding median.

TABLE 6

Differences between departments

DEPARTMENTS, NAMES OF FOREWOMEN	AVERAGE PERCENTILES, 5 TESTS	MEDIAN PERCENTILES, 5 TESTS
Chab	61	70
Ross	55	67
Hod	65	65
Brod	66	65
Barb	61	60
Pri	49	55
Meis	41	43
Jeanm	53	49
Rol	50	43
Jeanj	39	40

Table 6 distinguishes the strong from the weak department from the point of view of manual dexterity.

INCREASING EFFICIENCY

Rest periods

Our psychological survey brought home the fact that it was age and not occupational incapacity which lowered the dexterity level of the personnel of our factory. This situation led us to use all psychological and physiological means which could be of any value for improving the situation.

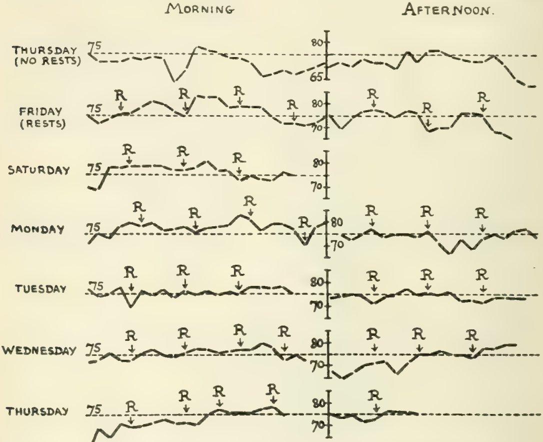

FIG. 4. CURVES OF OUTPUT BEFORE AND AFTER INTRODUCING REST PERIODS. *R* = A FIVE MINUTE REST

To the end of increasing the efficiency of the various departments, we endeavored to remove fatigue in every way possible, to introduce automatisms in the work-processes, and to study in detail the material environment of the workers.

To decrease fatigue, we undertook to introduce rest periods. But at the outset we encountered difficulties which could be overcome only in part.

To determine the best rest intervals for a given job, it is necessary to hold constant every factor of the working conditions except one, the rest periods. These can be varied. Such an experiment may require weeks, until one succeeds in finding the optimum duration and frequency of the recurring rests.

We chose at random a group of five women workers in a department, to whom we gave a certain wrapping task to do, the same for the entire duration of the experiment. On the first day, we had them work continuously without any stated rest. The operators interrupted their work whenever they liked. From the second day on, we introduced a five-minute rest hour, having them work steadily for 55 consecutive minutes. These conditions were kept constant for one week

Figure 4 shows that from the second day on, when a five-minute rest period had been observed, output increased.[5] The first day, the curve of output was below the average of the week; on the following days, it was above the average. This position of the curve was maintained for four days, but then descended to its original level. What was happening?

The workers, who had been accustomed for years to a variety of tasks, changing about every three hours, had the greatest difficulty in adapting themselves to working at the same job continuously for a whole week. There resulted sleeplessness during the night and headaches during the day, until at the end of the week some of the workers were in tears. This lack of variety explains why the curve of output, which had begun to rise in so encouraging a way with the five-minute rest every hour, stopped mounting, and even dropped down again on the last day to its original level.

We had to abandon the study of rest periods in all departments where workers were not used to long, continuous runs. This failure showed us the method to follow: although we knew that continuous work is more satisfactory to study, we had to consider the workers' need for variety. To meet this situation, we divided the work of certain jobs that had been performed by one or two workers only, among five operators. Thus, instead of wrapping and packing the pieces contained in one case of merchandise, a group of five workers packed in the same length of time the contents of five cases, which method did not require replacing the necessary wrapping supplies so often. The packing consisted of various operations. In order to avoid any loss of time from cluttering the table with too much material, resulting from the greater number of workers, we fitted to the table a conveyor belt, upon which the operators placed the wrapped articles. And in order to do away with the distracting effect on the eyes, we covered that part of the moving belt in front of each worker with a bridge on which the products were wrapped. This alteration also made it possible to place the conveyor closer to the operator, to avoid the necessity of stretching out her arm. When one case was filled, the workers changed location and operations, and had thus, as before the reorganization, the benefit of variety. Thus while maintaining the principle of varied jobs for each worker, we were able to turn out in a given time an increased production of the same unit of work as before.

In all departments where a more detailed study could not be undertaken we introduced an arbitrary five-minute pause every hour, but in departments where the workers had been assigned for full time to the same or to very similar jobs, we were able after experimenting to establish the most advantageous rest periods. In one instance they consisted of five minutes every hour; in another, of five minutes every half-hour.

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[5] This experiment was made with the cooperation of Dr. R. Meili, director of research at the Institut J. J. Rousseau.

Continuity of Movements, and Automatism

More extended use of automatized movements was another application of psychology to our reorganization.

We always respected the natural tempo of the average operator, never speeding up her work. In a given time, an operator turns out the same number of pieces now as before our investigation, but she has been given the possibility of keeping at her own natural rate continuously all day long, which she could not do previously. We were able to establish this continuity of work by means of linked movements, which Münsterberg describes in his Psychology and Industrial Efficiency. These result in automatized movements. Chains of automatic motions which are, nevertheless, technically perfect movements, have the advantage of becoming unconscious to the individual, saving every effort of will and of attention, thereby greatly facilitating his work.

THE PROBLEM OF MONOTONY

It might be objected that through mechanization we have added to the monotony of work, yet this reproach does not seem justified. First, monotony is not a feature of the work itself: it is to be attributed to the psychological attitude of the individual. With certain people, standardized repetitive jobs produce a feeling of monotony; that is, a sense of fatigue or weariness, although often there is less feeling of physical tiredness than there is of sheer boredom accompanied by a lessened desire to work; with others, the same operations create either pleasant feelings or indifference. Moreover,the mechanization of the methods of production is an inevitable consequence of the division of labor and of technical progress. It could be stopped only by stopping that very advance. There is no doubt that through the interjection of mechanization between the worker and his work, most workers have lost the immediate satisfaction that comes from self-expression in labor. If we do not wish to underestimate the intelligence of the working class, it seems hard to believe that the present way of working in industry, differing in so many ways from the exercise of the craftsmanship that is disappearing from our industrial world, is for workers a source of mental and moral development. There is nothing more stupefying than the specialized work of our modern industries. The only relief we can offer the worker is to make his work require as little attention as possible, in order to permit the mind to be occupied with other things. The direct stimulus of pleasant work, which is disappearing in the course of evolution in present day industry, ought to be replaced by an indirect stimulus: shorter working hours, with reading and music in the various departments, as far as possible. But, to be able to enjoy such things, the worker's mind must be really freed. This is what the psychology of labor is aiming toward, when making use of sequences of automatized movements, with their beneficial results, so familiar to every one of us in everyday life. Think, for instance, how little attentive thought we need give the daily task of dressing.

TECHNICAL ASPECTS OF WORKING CONDITIONS

The final method used in our work of reorganization was to study the material environment of the worker, with the aim of effecting a better adaptation of machines, tools, and work benches to the psycho-physical constitution of our women workers. We tried always to eliminate unnecessary fatigue, as shown in the following concrete examples.

In one of the departments, the work-benches were provided with a conveyor belt, but curiously enough it was not used continuously. Instead of laying the boxes on the belt as they were filled, the workers kept them until a number of boxes were ready, when they were all placed on the belt at once. So, when the boxes reached the wrapping operators, they had to be taken from the belt all at once and put on the table along side the workers, before being wrapped. Instead of taking the box for immediate wrapping it was first set down and then taken up again. This double handling seemed a waste of motion.

In the attempt to learn why this was done we noticed that in order to take a load from the belt the operator was obliged to bend forward. The table was a little too wide, and the belt too far away. To avoid the fatigue this occasioned, the women preferred to stand up, take a number of boxes from the belt at once, and then lay them down where they could be picked up more easily. The same table was used for two kinds of operations, differing with the weight and size of the product: smaller articles were wrapped while the operators were seated; large paper bags containing several kilograms had to be wrapped while standing. The width of the table was just right for the latter operation.

To adapt the width of these benches to the movements involved in handling the smaller articles, and to avoid fatigue of the muscles of the right arm and shoulder, the benches were narrowed throughout their entire length. The strips cut away were replaced as hinged leaves. Now, when the operators are working seated, the leaves are dropped so that they can sit only 30 cm. away from the belt. This makes it possible for them to take the articles from the conveyor without fatigue.

This change has resulted in more continuous and better balanced work from the point of view of distribution and duration of the operations. A time study of one specific job performed at the belt will serve as an illustration. (See fig. 5).

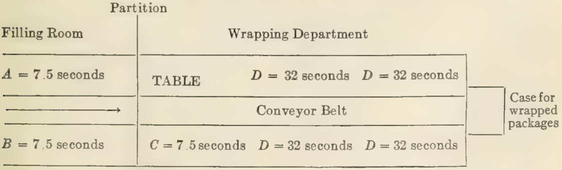

FIG. 5. SHOWING RELATIVE POSITION OF WORKERS AND TIME REQUIRED FOR EACH OF FOUR OPERATIONS

Operation *A*: Automatic filling by machine of a small paper bag.

Operation *B*: Putting filled bag into a tin container.

Operation *C*: Gluing a printed label around the tin.

Operation *D*: Fancy wrapping of the labeled tin. The wrapped container is replaced on the belt, which carries it to the packing case at the end of the bench.

This modification of the installation gave us an efficiency increase of 44 per cent.

Let us now examine another specific example taken from a different department.

This was at an automatic wrapping machine. We modified the hand operations connected with the machine work according to Münsterberg's principle of linked movements.

TABLE 7

Changes introduced in filling boxes of 16 pieces, and in making up packages each containing 12 of these boxes

BEFORE (MACHINE RUN BY 5 OPERATORS)		AFTER (MACHINE RUN BY 4 OPERATORS)	
First operator fed product to wrapping machine		*First operator.* No change	
Second operator fed papers to wrapping machine		*Second operator.* No change	
Third and fourth operators alternately filled box with wrapped product, and closed box		*Third operator* fills box but does not close it	
	Time, in seconds 3d operator 4th operator		*Time, in seconds* 3d operator
Filling box	9 + 9	Filling 2 boxes	18
Closing box	4 + 4		
Waiting	5 + 5		
Total for 2 boxes	18 + 18 = 36	Total	18
Fifth operator made up packages containing 12 of these boxes, and labelled packages	*Time, in seconds*	*Fourth operator* closes boxes in addition to work formerly done by fifth operator	*Time, in seconds*
		Closing 2 boxes	8
1/12 of making 2 packages	7	No change	7
1/12 of gluing 2 labels	1	No change	1
1/12 of pasting 2 labels	1	No change	1
1/12 of stamping 2 packages	0.3	No change	0.3
1/12 of carrying away 2 packages	0.2	No change	0.2
Total time working	9.5	Total time working	17.5
waiting	8.5	waiting	.5
Total	18	Total	18

At this automatic wrapper, the hand work consists of four operations:

(1) One worker places in line on a steel belt small pieces of the product, to be wrapped automatically by the machine.

(2) A second operator feeds the machine with small printed sheets of paper, for wrapping the article.

(3) Two more operators take turns in (*a*) packing into a small card-board box the automatically wrapped pieces as they come out of the machine on a conveyor; and then (*b*) closing the box.

(4) The final operation consists of wrapping a number of these boxes together into packages, and of labeling the packages. This operation is performed by a fifth worker.

In observing how the third operation was accomplished, we noticed that the two workers were continually getting in each other's way as they alternately turned to pick up the pieces wrapped by the machine. Moreover, the time required for packing the pieces into the box was not the same as the time necessary for closing the box. Therefore no continuous rhythm could be established in the work. It could not be automatized because the movements were not linked. This unevenness caused a nervous strain and tired the operators. Furthermore, the last worker of the group, wrapping the boxes into packages, was not kept busy all the time. Table 7 gives the time studies for these third and fourth operations before and after the changes were made.

By having the boxes closed by the operator who makes up the packages (fourth operation), instead of by the picking-up and filling operator (third operation), we obtained almost perfectly balanced periods of time, and succeeded in getting linked movements.

As a result of this change, the second picking-up and filling operator was eliminated, the machine was run by four operators instead of five as before, and the efficiency increased 20 per cent.

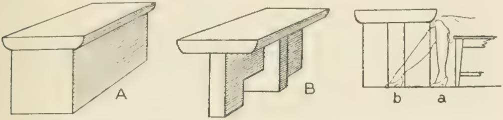

FIG. 6. *A* = DIAGRAM SHOWING OLD ARRANGEMENT; *B* = DIAGRAM SHOWING NEW ARRANGEMENT; *a* = POSITION OF LEGS BEFORE CHANGE; *b* = POSITION OF LEGS AFTER CHANGE

A final example will show to what extent a physiological study of the material equipment can help to reduce fatigue.

There is another machine, of which fig. 6*A* represents only the outline, which has long been in use in the particular line of industry we are studying. In observing how the work was being done at this machine, we noticed the abnormal position in which the operators had to hold their legs. We asked the engineer of the concern to make an effort to change the machine so that the legs could be in a more normal position. He found a solution that allowed the workers to sit more comfortably at their work. This is an example of the coöperation that can and ought to exist between psychologist and mechanical engineer. Formerly the operators produced two trays of small pieces of the product, after which they had to rise and carry the trays to the next department. Due to the abnormal position of the feet, this interruption in the work was a physiological necessity, in order to keep working all day. If this interruption had not existed, the workers would have invented it. As a result of this change in design, it was possible to place the machines next to the wall which separated the producing and packing departments. The workers then were able without rising from their seats to hand the finished product to the next department through openings made in the wall for the purpose. Only after this change were the workers able to remain seated at their machines, rising only once an hour for a rest period of five minutes.

In order to automatize the manufacture of the product, that is, in order to have the work done without thought on the part of the operators and without interfering with the perfect quality of production, we have determined and prescribed the exact amount of each variety of the product that is to be laid on the tray. A worker obviously loses time in trying to crowd into an almost filled tray one last piece for which there is not quite enough room. If therefore there is a regulation as to the number and arrangement of pieces to be placed on the tray, the work becomes regular and can be made automatic.

The changes we introduced at these machines resulted in a 30 to 40 per cent increase of output, without accelerating the tempo in the least.

RÔLE OF THE TECHNOPSYCHOLOGIST

These few examples taken from our numerous experiments in this factory illustrate the usefulness of industrial psychology. Without encroaching upon the domain of the mechanical engineer, and without any previous initiation into the technical side of the particular industry involved, the psychologist is able to improve the working conditions of a plant, to the extent that the psychology or physiology of the workers contribute to the problems of work. The psychologist does not make the work of the engineer superfluous any more than the latter replaces the psychologist; but their relationship is very close.

The entry of the psychologist into the factory represents an infinitely small part of the management of the great industrial machine; but his is no less important than any other function in industry, as our short study suggests. It is this thought which decided us to communicate the results of our investigations to others interested in applications of psychology to practical affairs.

(*Manuscript received September 1, 1928.*)

Tests for Garment Machine Operators[1]

By Katharine Treat, *Vocational Adjustment Bureau,*[2] *New York*

Ability to learn to operate a power machine is a minimum requirement for some of the least exacting employments in the garment industry. The Vocational Adjustment Bureau has made a definite contribution to the problem of how to decide, in advance of training, whether a girl probably has this ability.

This article describes the method and gives the results of an attempt to measure by a series of psychological tests the aptitude of subnormal girls for power machine operating in the garment trades, and thereby to predict probable successes and failures. The tests were standardized on a group of girls from the New York City elementary schools. Every girl had an Intelligence Quotient of .70 or below on the Terman Revision of the Binet-Simon scale. Each girl was given 90 hours trial on the machines. A team of five tests showed a positive correlation of .66±.04 with the ability to learn operating, and would have eliminated 76 per cent of the failures if given in place of actual trial on the machines. There are other factors eliminating failures for this group, such as emotional instability and a mental age below eight years.

THE purpose of this experiment was to see if the aptitude of subnormal girls for power machine operating could be measured by a series of tests. A number of psychological tests were given to a group of subnormal girls upon entering a trial class organized for the purpose of determining how many girls of this type could learn to do such work. "To learn" was defined,—to learn to operate the power machine and to produce work which should reach or exceed the average standard set by the machine operating industries. If significant relationships were found, the tests could be given in place of actual tryout on the machines, to separate probable successes from probable failures among future applicants for such trade training.

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[1] This experiment would have been impossible without the complete coöperation and invaluable help of Mrs. Edna W. Unger, Director of Industrial Experiments for the Vocational Adjustment Bureau, and Director of the experiment in connection with which these tests were devised; Dr. Emily T. Burr, Director of the Vocational Adjustment Bureau; Miss Mary McCrystall, Instructor of the machine operating classes; and Dr. Arthur Frank Payne, who read the manuscript and helped with the organization of the material.

[2] The Vocational Adjustment Bureau is a social service organization, specializing in the study of problem girls, particularly in relation to vocational guidance and employment. The maladjustments of these girls often are due to subnormal mentality or psychopathic tendencies which may result in social and industrial inadequacy. By taking into account the entire situation surrounding the girls, and by studies of the Research Department, an effort is made to place each girl where she may develop to the limit of her capacity. The Bureau maintains an experimental therapeutic workshop, to which nervous and mentally disturbed girls are sent for economic rehabilitation.

Devising the tests was part of a larger experiment[3] the purpose of which was to find out by actual trial on the machine, (1) whether girls of subnormal mentality are capable of learning how to run an electric sewing machine sufficiently well to be recommended for a job in the machine operating industries; (2) if so, what factors contribute to their success; and, (3) how these factors can be measured.

As far as possible the atmosphere of the shop rather than the classroom was maintained, and trade standards were adhered to as closely as possible in every phase of the work. The class was defined, however, purely as a testing class with no attempt to train for the trade.

The experiment was carried out at the workrooms of the Emanuel Sisterhood of Personal Service, 318 East 82nd Street, New York.

DESCRIPTION OF GROUP

One hundred seventy girls had passed through the classes from July 1923 to the first part of March 1925, but there were complete records for only 101 girls. Of the total number, 148 were sent by the public schools, (54 per cent either were in the ungraded classes or had previously attended such classes), and 22 by the Vocational Adjustment Bureau.

The tests were devised and standardized on the first 45 girls,[4] and a team of tests constructed and given to 56 girls who entered subsequently, making 101 girls in the total experimental group.

Chronological age. The girls in these classes were quite young, ranging in age from 12 years and 4 months to 16 years and 4 months, with two girls at 19 years. The average was 15 years and 3 months with 80 per cent of the girls between 14 and 16 years of age. This was approximately the age at which such girls usually enter industry.

Mental Type. Only girls subnormal in general intelligence were admitted to the class. It was decided to consider girls subnormal whose intelligence quotient was below .70 as obtained by the Terman Revision of the Binet-Simon Test. In figuring the intelligence quotient, 16 years was considered the maximum chronological age.

The girls ranged in mental age from 5 years and 10 months to 11 years and 2 months (the mental age of an individual 16 years of age whose intelligence quotient is .70). The average mental age was approximately 8 years and 11 months with two-thirds of the group between between 7 years and 9 months and 10 years and 1 month.

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[3] For a complete description of these classes see: Edna W. Unger, *Vocational Training for Subnormal Girls, An Experiment in the Garment Machine Operating Trade.* Journal of Personnel Research, October, 1926, pp. 243–255.

[4] For a complete report of this experiment on the preliminary group of 45 girls see: Katharine Treat, *A Team of Psychological Tests for Mentally Deficient Power Machine Operators.* Unpublished thesis, Columbia University, October, 1924.

The range in intelligence quotients was from .40 to .70. The average I.Q. was .58, with two-thirds of the group between .53 and .64.

Although chronologically and mentally a fairly homogeneous group, the class was otherwise unselected and probably represented as varied types as possible within these limits. As a whole the group was fairly stable. Eleven girls showed neurotic tendencies that were likely to cause future difficulty in industrial adjustment.

STANDARDS AND MEASUREMENTS OF ACCOMPLISHMENT

The criterion with which each test was compared for the *first group of 45 girls* on which the original battery of tests was standardized, was a single mark made up from an average of the actual marks given for work in machine operating day by day. A five-point scale was used: poor, poor-plus, fair, fair-plus, and good. All work was rated on six points,—accuracy, speed, neatness, handling, grasp of directions, and attitude. In the final mark, the two items of accuracy and speed were weighted by giving each twice the value of the other items. The final weighting was obtained by adding the weighted score and dividing by 8. This was an objective work rating.

For the *whole group of 101 girls*, however, there was added to this objective work rating a subjective rating. Thus the absence of the incentive of remuneration, competition, pressure, strain, etc., was taken into account by the instructor in judging the chance of success of each individual as a future operator. Some who rated well in actual accomplishment had to be rated subjectively as possible failures in industry for such reasons as nervousness, inability to concentrate, quarrelsomeness, need of constant prodding, etc., while others who rated slightly below average on the basis of actual accomplishment, were considered possible successes for such reasons as personality, failure to put forth full effort because of lack of financial compensation, etc. The correlation between the objective work rating and the subjective rating was .87 ±.02,—almost high enough to warrant their being used interchangeably. Since the purpose of this experiment was not only to measure the trainability of the subnormal girl as a machine operator, but also to estimate her probable success as an operator in industry, it was decided to use the second or subjective *judgment rating* as the criterion for the group of 101 girls, after approximately 90 hours of training in operating.

Twenty-one girls or 21 per cent were probable successes, 21 or 21 per cent were doubtful successes, and 59 or 58 per cent were probable failures.

TEAM OF TESTS CHOSEN

The conditions for testing were very good. The individual tests were given in a separate room, and for the group tests the girls used their machine desks. All the tests could not be given before the class started to work, so the testing was extended over the six-weeks period for each group.

All but six of the girls were still in school and took the testing as a matter of course. In case of nervousness or disinclination to take the tests, those tests requiring fore-exercises were given first, or some preliminary puzzles were used as "shock absorbers," or the testing was postponed.

A preliminary battery of 18 tests was used with the first 45 girls in the class. The tests are for the most part widely known, so no detailed description of them is given. The following is a classified list of the tests used:

Intelligence Tests
- Stanford-Binet
- Porteus Maze

Directions Test
- Easy Directions Test (arranged by Woodworth and Wells)

Association Test
- Substitution Test (Woodworth and Wells)

Cancellation Test
- Number Cancellation (Woodworth and Wells)

Form Board Tests
- Mare and Foal (Pintner and Paterson)
- Casuist Form Board (Pintner and Paterson)
- Healy Puzzle A

Tests for Motor Abilities
- Trimming Test (Institute of Educational Research, Girls' Mechanical Assembly Tests)
- Paper Folding Test (Glenn)
- Motor Control (Burr)
- Zigzag Test (Mead)
- Card Sorting Test
- Dexterity Test (Scott)
- Steadiness Test

Special Tests
- Stenquist Mechanical Assembly Test
- Vision Test (Snellin Eye Chart)

Those five tests which showed the highest correlation with the objective work rating were chosen for the team of tests. They were the following five tests which were used as a team of tests for the entire group of 101 machine operators.

Trimming Test.[5] This is Test 11 of the Girls' Mechanical Assembly Tests, Institute of Educational Research, and was given as a group test to small groups. It involves cutting out a design between a path of double lines, the path becoming narrower as it progresses. The excellence of the performance depends upon ability to avoid touching the lines.

Porteus Maze Test.[6] There are eleven mazes on a scale of increasing difficulty designated by ages, from the third to the fourteenth year. The test age score of the subject is expressed in terms of mental age.

Paper Folding Test.[7] This is a simple test consisting of folding five 4x4 sheets of yellow paper into smaller pieces in a designated way. The subject is told to fold, as quickly and neatly as possible, her five sheets one after the other in just the way the examiner illustrates. The papers are scored for time and quality, but only the quality score is considered. The subjects are hurried in order to see the quality of work they could do under pressure. It is a simple test to comprehend, and after the first paper is folded becomes a test of manual dexterity requiring precision, neatness, and speed, rather than comprehension.

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[5] Herbert A. Toops. *Tests for Vocational Guidance of Children Thirteen to Sixteen.* Teachers College, Columbia University, Contributions to Education, 1923, No. 136, pp. 123–125.

[6] S. D. Porteus. *Porteus Tests.* The Vineland Publications of the Training School at Vineland, N. J., September, 1919, No. 16.

[7] Irene Glenn. *A Report on the Correlation of Mental Tests with Academic and Manual Subjects.* Journal of Educational Psychology, vol. 3, p. 496.

Card Sorting Test. This test consists in arranging according to suits two packs of playing cards with four cards removed to make an even hundred cards. The cards were always presented to the subject in the same order and she was told to arrange them into the four suits which had previously been pointed out to her.

Scott Three-hole Dexterity Test.[8] The apparatus for this test consists of a block of wood about five inches by eight inches, in which there are holes arranged to make an equilateral triangle. The holes are metal. Behind each hole is a small metal counter. The board is supported to stand at an angle of 45 degrees. There is a metal stylus with a wooden handle. The subject is told to take the stylus and insert it into the holes in rotation as quickly as possible. A trial practice period of 15 seconds with each hand is given. Then the total number of taps made by the right hand and registered by the counter on the back of the board in 30 seconds is averaged with the total number made by the left hand in 30 seconds. This is the score.

METHOD OF HANDLING DATA

The scores for the various tests for the preliminary group of 45 girls had to be made comparable before adding. This was done by giving the respective series of scores the same degree of dispersion, and then, by a formula, converting each score on each test into the new series.[9] These new scores for each girl for each test were added together and the result was the girl's total team score. The formula for converting these scores was worked out and standardized on the preliminary group of 45 girls, and then applied to the total group of 101 girls of which these 45 were a part.

The criterion correlations for the preliminary group of 45 were found by the Spearman Rank Order Method. The coefficients of correlation obtained in each case were transmuted to the equivalent of the Pearson coefficient of correlation.

For the total group of 101 the correlations with the criterion were computed by the Toops' revision of the Pearson correlation formula. Toops' multiple ratio correlation formula was applied to these raw correlation coefficients, on both the raw scores and the team scores, to select the team or battery of tests which would yield the maximum prediction of the criterion.[10]

CORRELATIONS

The correlations for the preliminary group of 45 girls between their rank in machine operating and the rank in each of the several tests varied all the way from +.69 to −.49. The tests chosen for the team were those five tests whose coefficients of correlation were of the greatest magnitude, and which were also practical and quick to administer. The five tests in the team can be given in the comparatively short time of 30 minutes. This includes explanations, actual time consumed by the tests, and computation of the total score.

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[8] Walter Dill Scott. *Personnel Management.* A. W. Shaw Co., Chicago, 1923.

[9] Clark Hull. *The Conversion of Test Series into Series which Shall Have any Assigned Degree of Dispersion.* Journal of Applied Psychology, vol. 6, pp. 288–300.

[10] The statistical work for the total group was done by Mrs. Zaida Miner, Statistician, Teachers College, Columbia University.

Table 1 shows the coefficients of correlation for the five team tests with the criterion for the group of 45 girls.

TABLE 1

Showing coefficients of correlation of tests with criterion for 45 subjects

NAME OF TEST	COEFFICIENT OF CORRELATION	PROBABLE ERROR
Trimming	.69	±.05
Porteus Maze	.65	±.06
Paper Folding	.63	±.06
Card Sorting	.60	±.07
Scott Dexterity	.54	±.07

The sum of the scores in these five tests correlated .84 ±.029 with the criterion. The correlation of the added scores for the five tests is thus considerably higher than that for any single test. A single test is limited in scope and measures only a few of the factors required by the operation. By combining several kinds of tests, all of whose coefficients of correlation are high and positive, one test compensates for and adds to another, giving a more reliable picture of the "general ability." Because of the statistical method used there is no way of telling what any single test is contributing, but it did not seem worth while to use the multiple correlation method when there were only 45 cases to consider.

Although the correlations are high and positive for the total group, they are considerably lower than those obtained on the preliminary group. A larger sampling of girls was used, however, and a more reliable method of statistical analysis. The results are therefore more indicative of the real situation.

TABLE 2

Showing coefficients of correlation of tests with criterion and with each other for total group of 101 girls

	CRITERION	PORTEUS MAZE	TRIMMING	PAPER FOLDING	CARD SORTING	SCOTT DEXTERITY
Criterion		.58	.52	.52	.35	.21
Porteus Maze	.58		.48	.58	.45	.15
Trimming	.53	.48		.56	.39	.21
Paper Folding	.52	.58	.56		.42	.12
Card Sorting	.35	.45	.39	.42		.24
Scott Dexterity	.21	.15	.21	.12	.24	

Table 2 shows the correlations with the criterion and the intercorrelations between the five team tests. It is interesting to note that there is a change in the rank order of the magnitude of the coefficients of correlation from that of the preliminary group where the *Trimming Test* instead of *Porteus Maze* showed the highest correlation with the criterion.

The total scores on the team tests show a positive coefficient of .66 ±.04[11] with the criterion for the total group. Although this correlation is sufficiently high to suggest the value of the tests, it is considerably lower than the correlation of .84 ±.029 on the preliminary group.

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[11] In Mrs. Unger's report, *Vocational Training for Subnormal Girls*, Journal of Personnel Research, October, 1926, page

CRITICAL SCORE METHOD

When the final test scores for the preliminary group of 45 are plotted on a scatter diagram with the criterion scores, that is, scores in operating, it is apparent that 250, the median score, is the dividing line for weeding-out purposes. All of the probable successes in operating score above this point, and all but two of the doubtful successes. It eliminates 19 out of 24 failures or approximately 80 per cent. The scores of the five failures included are 262, 261, 255, 253, and 252. Their ranking respectively in the group of 24 failures is 4, 3, 12, 16, and 1. Thus three of these subjects considered failures are more or less on the borderline of doubtful successes when their rank order in the group is considered. Lack of ability to concentrate and lack of interest seemed to be the cause of failure for the other two girls, rather than lack of ability to do this kind of work. Thus we may call the total team score of 250 the *critical score.*

A critical score chart plotted for each test separately with the criterion shows any single test to be practically valueless in eliminating failures.

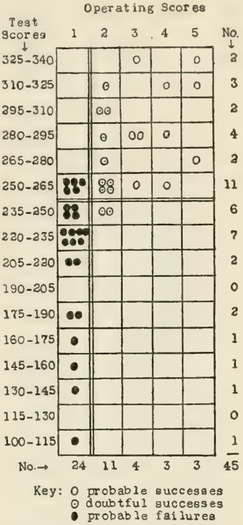

FIG. 1. CRITERION SCORES AND FINAL TEST SCORES PLOTTED TO SHOW CRITICAL SCORE FOR PRELIMINARY GROUP OF 45 GIRLS

Figure 1 shows graphically the value of the critical score method when the criterion scores are plotted against the final test scores.

When the final test scores for the total group are plotted with the criterion or judgment rating, it is appar-

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252, the correlation of the total team scores with the criterion is given as .59 ±.05, whereas it is given in this article as .66 ±.04. The original multiple of total scores was computed on the basis of total scores obtained by combining tests according to the original weights used, and the latter multiple by combining the single tests and building up the correlation the .07 points.

ent as with the preliminary group that 250 is the critical score. If, therefore, a preliminary selection on the basis of the total score made on the team of tests with a critical score of 250 is made, 45 out of 59, or approximately 76 per cent of the failures, are excluded. Only 9 doubtful successes and two probable successes are eliminated. One of these successes was very immature and the other had an I.Q. of .49 with a mental age of 7.8 years. There are still 14 or 24 per cent who failed, not eliminated by a critical score of 250. These failed, therefore, not from lack of specific motor abilities measured by the tests and presumably required by machine operating, but because of the absence of certain other necessary qualities, possibly those classifiable under the head of "personality."

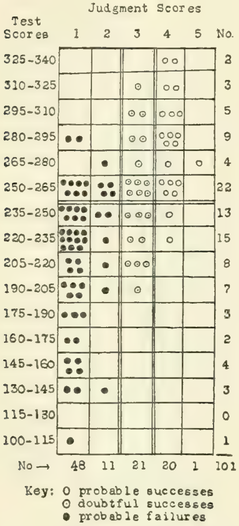

FIG. 2. CRITERION SCORES AND FINAL TEST SCORES PLOTTED TO SHOW CRITICAL SCORE FOR TOTAL GROUP OF 101 GIRLS

Figure 2 shows graphically the value of the critical score method when the criterion scores are plotted against the final test scores for this group of 101.

To the knowledge of the writer, no short method of evaluating elements of personality has been satisfactorily derived nor any test or chart method which would show even in small measure the traits revealed through contact with the individual during such a test period as that in the machine operating class.

A glance at the records of the 14 girls who, while above the average in total team score, and thus apparently possessed of those specific motor abilities demonstrated by the tests, were failures in the machine test, shows that five were considered as decidedly institutional cases,—so hopeless was the prognosis for success at even the lowest grade unskilled work; three were emotionally unstable; and nine seemed incapable of that concentration and application that would have turned to account such operating ability as they did possess. In one case the work seemed physically a little too strenuous.

OTHER ELIMINATING FACTORS

In considering other possibilities besides the team of tests in eliminating failures, none was found to be so valuable.

Chronological Age. For this narrow range there seems to be little relationship between chronological age and ability to run an electric power machine. There is a positive correlation of only .016±.07 between these two factors.

Mental Age. There is considerably more relationship between mental age and the ability to run an electric power machine than there is between chronological age and this ability. The correlation is .36±.07. This relationship, however, is not particularly significant, except that below the eight-year mental level there were only two probable successes. Above that there is a slightly increasing percentage of successes for increasing mental age. A preliminary weeding out of possible future failures with eight years mental age as a critical score will eliminate approximately 33 per cent of the failures.

In comparing the failures eliminated by the tests with those eliminated by a mental age of eight years, it is evident that the total team score of 250 is the more valuable. By a preliminary elimination of failures with a mental age under eight years, 40 out of the total number of 59 failures were not eliminated, whereas only 14 failures were not eliminated by the team score of 250.

Only one failure with a mental age under eight years made a team score of over 250; 67 per cent of the failures with a mental age over eight years made a team score under 250; 13 of the 14 failures not eliminated by the team score had a mental age over eight years and thus were not eliminated by either score; one failure was eliminated by mental age who was not eliminated by the team score, (it is always possible that the result of the mental test given was inaccurate); and the team score eliminated 27 failures not eliminated by mental age.

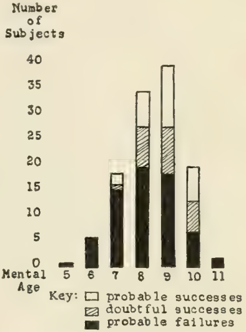

FIG. 3. SHOWING NUMBER OF SUCCESSES, DOUBTFULS, AND FAILURES AT EACH MENTAL AGE

Figure 3 shows the number of probable successes, doubtful successes, and probable failures at each mental age. At the seven-year level 13 per cent were probable successes, at the eight-year level 21 per cent, at the nine-year level 31 per cent, at the ten-year level 38 per cent, and at the eleven-year level there were no successes.

Intelligence Quotient. The intelligence quotient as a factor in eliminating failures gives practically the same results as the mental age factor. Between the I.Q. and the criterion there is a positive correlation of .35±.05. A preliminary weeding out, with a critical score of I.Q. .50, will eliminate 24 per cent of the probable failures. A comparison between the preliminary elimination of failures with a critical score of I.Q. equal to .50 and a critical team score of 250 reveals that the total team score is more valuable. Twenty-six out of 59 failures or 44 per cent were not eliminated by an I.Q. of .50. No failure with an I.Q. under .50 succeeded in making a team score over 250. Of the failures with I.Q. over .50, 68 per cent made total team scores under 250. The 14 failures not eliminated by a team score of below 250 had an I.Q. over .50 and thus were not eliminated by either score. No failure was eliminated by an I.Q. of .50 who was not eliminated by the team score. The total team score eliminated 30 failures not eliminated by the I.Q.

CONCLUSIONS AND RECOMMENDATIONS

The team of psychological tests do discriminate between probable successes and probable failures.

The critical score method is probably the most practical and useful method for weeding out probable failures.

If training in power machine operating for girls subnormal in general intelligence should be continued by the Vocational Adjustment Bureau or any other agency, no girl should be admitted to the class unless she has a mental age over eight years as measured by the Terman Revision of the Binet-Simon Test for General Intelligence, is emotionally stable, and achieves a score of 250 or more on the team of psychological tests described in this report.

From the results of this experiment there is no reason to believe that these tests would be valid for any other group of girls learning machine operating unless the same requirements for entrance to the class were imposed, and a similar course of training was given. The three or possibly four most valid tests, however, should be tried out on similar groups so that they may be further standardized, and then with groups perhaps slightly higher mentally and chronologically to see whether the tests can be used for selective purposes for such higher groups.

(*Manuscript received November 15, 1927.*)

Intelligence of Young Printers

By Don H. Taylor, *New York University*

The coöperation between trade-unions, employing printers and continuation schools in the training of apprentices, which has long been effective in New York City, provided a setting for this study of the distribution of intelligence among future compositors and pressmen of the industry. Dr. Taylor is Assistant Director of the National Junior Personnel Service, Inc.

The National Junior Personnel Service, in a recent survey of the adjustment problems of employed youth in Greater New York, had occasion to give the Otis Advanced Examination to several occupational groups, including more than 1200 young printers. Composing room workers seemed unselected on the basis of the ability measured by the test. Pressroom workers, on the other hand, showed a marked inferiority in the ability measured by the test. There was some evidence that this difference might be due to experience requirements rather than to job requirements. The results seemed sufficiently significant to warrant a more elaborate effort to determine the characteristics of successful workers in the trade. Such a study is in progress.

A STUDY of adjustment problems of employed youth made by the National Junior Personnel Service in 1927 afforded an opportunity to give intelligence tests to a large group of young printers in New York City who were either apprenticed as compositors or pressmen in union print shops, or were employed in printing establishments and looking forward to such apprenticeship.

Union regulations in New York City require that pressmen's and composirors' apprentices in union shops attend once a week schools organized for their crafts. All the young men enrolled in apprentice schools at the time of the study were tested; and as approximately 80 per cent of the printing establishments of the city were then operating in compliance with union requirements it may be assumed that those tested were representative of the young men in the industry in New York.[1] Tests were also given to a pre-apprentice group composed of fifteen- and sixteen-year-old boys who were attending the Central Printing Trades Continuation School for four hours each week. These boys had been admitted to this school because they were employed in the trade; had signified their intention of remaining in it; and, theoretically at least, had been certified by printing instructors in unspecialized continuation schools as having aptitude for the work. It is probable that many of the future apprentices in the industry will be selected from the students of this school.

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[1] New York City produces more than one-fifth of the printing of the United States, employing approximately 37,000 wage-earners in various branches of the industry. It is the greatest center of printing in the country.

Group tests of intelligence are notoriously unreliable as a method of exact diagnosis of an individual, but they do afford a convenient and valuable method for group comparisons. Likewise, though intelligence as measured by tests has been shown elsewhere[2] to be an important factor in scholastic success, less conclusive results have been obtained from studies of its importance for vocational success. It was hoped, therefore, that this very complete intelligence survey of young men in the printing industry in one city might throw some light on the question as to whether or not intelligence test results are of value for guidance into or selection for the two chief crafts in the industry.

TEST AND STATISTICAL MEASURES USED

The Otis Advanced Examination, Form A, was the test selected for the survey. Several group tests of intelligence are available which correlate highly with each other. Experimentation led to the conclusion that the test selected was as reliable and valid as any and for the group to be studied, probably the most desirable.[3]

Scores obtained by the Otis Examination can be translated into an *IB* or index of brightness. The *IB* representing exact normality for any age is 100. The *IB* for any individual is found by adding to 100 his Increment of Score above the normal score for his age or by subtracting from 100 his

TABLE 1

Young printers ranked according to index of brightness

IB	PRE-APPRENTICES	APPRENTICES		Total
		Compositor's	Pressmen's*	
170–179	1	1	0	2
160–169	3	3	0	6
150–159	7	11	0	18
140–149	11	17	3	31
130–139	30	22	7	59
120–129	41	34	22	97
110–119	46	36	15	97
100–109	56	64	11	131
90–99	56	63	28	147
80–89	59	54	19	132
70–79	60	55	27	142
60–69	33	45	29	107
50–59	26	29	26	81
40–49	14	21	35	70
30–39	11	10	24	45
20–29	5	3	21	29
10–19	5	6	14	25
1–9	2	1	14	17
Total.....	466	475	295	1,236

* This group includes 156 newspaper pressmen's apprentices and 139 job and cylinder pressmen's apprentices. Results for the two groups were so nearly identical that it seemed wise to combine them into a single group for the purposes of this discussion.

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[2] See particularly, W. M. Proctor, *Psychological Tests and Guidance of High School Pupils.* (Revised.)

L. T. Hopkins, *The Intelligence of Continuation-School Children in Massachusetts.*

[3] Detailed discussions of the validity of the scale are found in Arthur S. Otis, *An Absolute Point Scale for the Measurement of Intelligence*, Journal of Educational Psychology, May and June, 1918.

Lewis M. Terman, *The Measurement of Intelligence.*

Decrement of Score below the normal score for his age. The normal is the median score of unselected groups. The *IB* in turn may be translated into percentile rank. The percentile rank of an individual is the percentage of individuals of his age whom he exceeds in mental ability (as measured by the test). The normal or median percentile rank for any age, of course, is 50. The achievement of different age groups can thus be compared in terms in either *IB* or percentile rank. Both measures have been used in the interpretation of results.

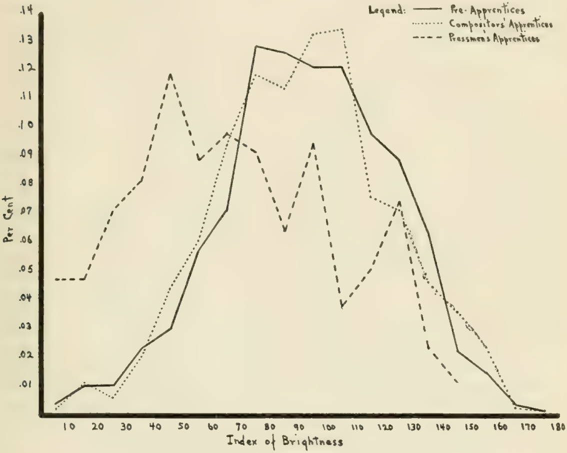

FIG. 1. DISTRIBUTION OF GROUPS ACCORDING TO INDEX-OF-BRIGHTNESS

Table 1 indicates the distribution of test scores for the three groups of young printers expressed in terms of *IB*.

A graphic representation of these results is shown in figure 1. The most obvious disclosures are first, the similarity of the curves for the continuation school group and the compositors' apprentices, and the approximation of both curves to the normal curve; and second, the extreme positive skewness of the curve for pressmen's apprentices.

Group comparisons of means and standard deviations of the frequency distributions of *IB*'s is given in table 2.

The similarity of results for the printing continuation school and the compositors' apprentice school is again indicated by this table as is the much lower rating of the pressmen's apprentice group. Statistically studied these differences are found to be even more significant. When comparing independent groups the usual way to test whether or not differences noted are due to chance is to compute the Probable Error of the difference using one of the statistical measures,—in this case the Mean. The formula used is

TABLE 2

Means, probable errors, and standard deviations of table 1 by groups

GROUPS	MEAN	P.E.	S.D.
Pre-apprentices	92.98	.948	30.35
Compositors' apprentice school	91.80	.952	30.74
Pressmen's apprentice school	67.27	1.408	35.84

$$P.E._{M_1 - M_2} = \sqrt{(P.E._{M_1})^2 + (P.E._{M_2})^2}$$

To be considered completely reliable a difference should be at least four times as large as its Probable Error.

When the means for the three groups (table 2) are thus studied two facts stand out:

1. The difference between the means of the continuation school group and the compositors' apprentice group, 1.18, is not statistically significant since the Probable Error of this difference is 1.345; that is, it is larger than the actual difference itself.

2. The differences between the mean of the pressmen's apprentice group and the mean of each of the other two groups are startlingly significant. Compared to the compositors' apprentice group the difference in means is 24.53, approximately fifteen times the Probable Error of the difference which is 1.70. Compared to the continuation school group, the difference in means is 25.71, again approximately fifteen times 1.697 which is the Probable Error of this difference.

The possibility that this difference of means is influenced by the wider range in case of the continuation school and compositors' apprentices distribution is dispelled by a comparison of the medians for the three groups:

Pre-apprentices: median *IB*	93.11
Compositors' apprentices: median *IB*	92.14
Pressmen's apprentices: median *IB*	64.66

The difference of medians is thus even greater than the difference of the means.

It is doubtful if conditions at time of taking the test or attitude toward the test materially affected results.[4] Apprentice groups maintained good order during the testing and so far as could be judged seemed genuinely interested in doing their best. The rooms were not overcrowded and there was almost complete absence from outside distractions. Any handicap due to environmental conditions or attitude would have been felt most severely in the case of the continuation school group. Some of the class rooms were very crowded at the time the tests were given; there was the occasional possible distraction due to the noise of presses operating in the next room;

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[4] The testing was done by J. V. Hanna, Instructor in Psychology, Washington Square College, and the writer, both of whom are members of the research staff of the National Junior Personnel Service.

and, being younger, there was more of a tendency towards restlessness and fooling during the testing period.

FACTORS AFFECTING TEST SCORES

Undoubtedly after a certain point age affects the mental test achievement of hand workers. It is reasonable to suppose that, other things being equal, the longer the time a manual worker has been out of school the less successfully he will respond to paper and pencil exercises such as those required by the Otis examination. Since the median age for the pre-apprentice group was sixteen years; for the compositors' apprentices twenty-one years; and for the pressmen's apprentices, twenty-seven years, the last group was perhaps at some disadvantage. Obviously, some of the daily tasks of the compositors' apprentices, such as correcting proof, copy holding, etc., have more in common with the requirements of the test than do the duties of pressmen's apprentices. No attempt was made to compute statistically or to devise ways of measuring exactly the effect of either age or nature of job duties on achievement in the test.

The difference in the achievement of the pressmen's apprentices from that of the other two groups is so marked, however, that it seems probable, making all allowances for the possible influence of other factors, that the results indicate a real difference in the ability measured by the test. The extreme positive skewness of the pressmen's distribution would also seem to indicate that no factor or factors were operating uniformly to effect achievement.

COMPARISON WITH AN UNSELECTED GROUP

Figure 2 provides a striking comparison of the relative achievement of the three groups by reclassifying the *IB* distributions according to the decile limits of a normal or unselected group.[5] In general all three groups show a tendency toward an undue proportion of population in the lower decile limits of the normal group and less than normal proportion in the upper decile limits. The pre-apprentice and compositors' apprentice groups, however, show no extreme disproportions, are well represented in every decile class and, on the whole, conform fairly closely to the normal. On the other hand, 48.5 per cent of the pressmen's group had *IB*'s falling within the limits of the lowest decile of a normal group, while only 1.0 per cent had *IB*'s coming within the limits of the upper decile. Expressed in still another way, more than two thirds of the pressmen's apprentice group had *IB*'s falling within limits containing the lowest 30 per cent of a normal group.

CONCLUSIONS

The following conclusions, therefore, seem warranted by the test survey:[6]

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[5] The norms upon which this chart is based are taken from *Manual of Instructions, Otis Group Intelligence Scale.* Yonkers: World Book Company, p. 74.

[6] At the time of the testing young men were apprenticed upon recommendation of the foremen in the respective shops. Applicants for apprenticeship as compositors were also given a physical examination. The major research, of which this test sur-

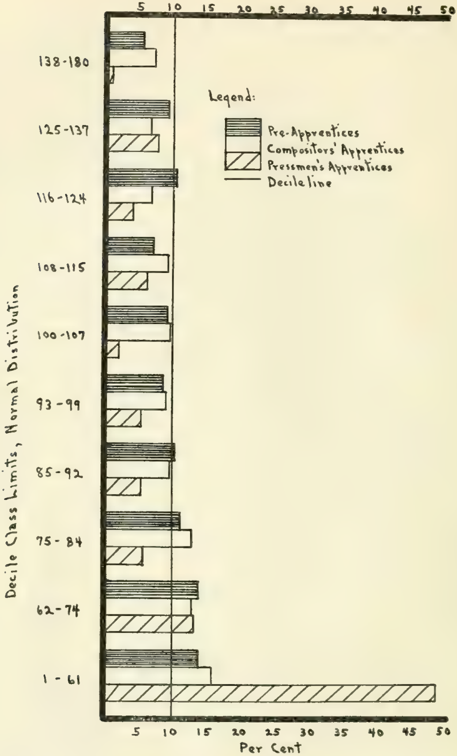

FIG. 2. INDEX-OF-BRIGHTNESS: DISTRIBUTIONS ACCORDING TO DECILE LIMITS OF NORMAL DISTRIBUTION

(Exactly ten per cent of normal distribution would fall within each class)

1. Intelligence, as measured by the Otis test, does not appear to be a factor in the selection of compositors' apprentices. All levels of ability are fairly uniformly represented in the group.

2. The pressmen's apprentices show a marked inferiority in the ability measured by the test. Apparently the dull youth finds more appeal in this branch of the industry and the bright boy feels there is less opportunity for him and enters another branch. It is probable, also, that the brighter boys are less inclined to undertake the feeder's apprenticeship required by the union prior to apprenticeship as job or cylinder pressmen and to spend the long term as feeders which is generally necessary before there is an opening for a pressman's apprentice.

3. So far as the ability measured by the test is concerned, the Central Printing Trades Continuation School pools a group of pre-apprentices who at the time of our study were at least equal to the apprentices in the industry.

(*Manuscript received February 15, 1929.*)

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vey was a part, revealed the need of more effective methods of apprentice selection for the trade. As a result, a three-year study of objective means for apprentice selection is being made by the research staff of the National Junior Personnel Service, Inc., under the general supervision of an advisory committee composed of Albert T. Poffenberger, Henry C. Link, Morris Viteles, L. J. O'Rourke, Layton S. Hawkins, J. V. Hanna, Lynn A. Emerson, and Morris Krugman. This investigation is financed coöperatively by the National Junior Personnel Service, Inc. and the Joint Boards of the School for Printers Apprentices, the School for Printing Pressmen, the School for Newspaper Printing Pressmen and the School for Machine Training. A preliminary analysis of qualifications essential for success in various branches of the trade has just been completed by Milton Hall.

Rates of Promotion in Army and Navy: A Personnel Study of Officers of Highest Rank

By Roy N. Anderson, *Teachers College, Columbia University*

The data here presented are of practical importance in showing a young man who aspires to a military career what may be his probable rate of advancement on the road to the top. They furnish a new example of the investigation of vocational histories as an aid in personnel work.

To obtain information regarding the rapidity with which promotions come in the Army and Navy, an examination was made of the vocational histories of all those officers having attained the permanent rank of Brigadier-General, Major-General or Rear-Admiral (total 350).

The data for the investigation were gathered from *Who's Who in America.* Tabulations show the median age at which these officers received appoinment to each of the ranks leading to their final status. Vocational ladders are made representing the histories graphically. These figures show that the amount of time required to travel from Second-Lieutenant to Major-General was, on the average, thirty-seven years; and that the amount of time required to travel from Ensign to Rear-Admiral was, on the average, thirty-five years. The period of time spent at each rank is also revealed.

THE past decade has shown an increasing demand for vocational guidance. Young men and women ask vocational counselors and employment managers questions relative to progress in various vocations. They inquire: "How far can I get in this vocation?" "How fast may I expect to progress in it?" "How much can I earn?" To be answered: "That all depends on you," or "There is always room at the top," does not give very much help to a perplexed youth who needs facts, not generalities, as a basis for planning a career.

More enlightening answers can be given to these questions and various scientific methods can be used in compiling the necessary information. One method proposed[1] is to study the vocational histories of individuals who have succeeded in the occupations examine their experiences and compile them into typical patterns of vocational progress.

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[1] Harry D. Kitson, *The Scientific Compilation of Vocational Histories as a Method to be used in Vocational Guidance*, Teachers College Record, September, 1926, Vol. 28. Pp. 50–58.

This investigation is an attempt to apply this technique to two somewhat similar vocations,—that of the officers in the Army and Navy. The men whose vocational careers were studied include all those who have reached the highest ranks in these vocations; namely, all the living Major-Generals in the Army and the Rear-Admirals in the Navy. The data were taken from *Who's Who in America*, (Vol. 14, 1926-27). The total number of cases studied is 350, distributed as follows: 97 Major-Generals; 116 Brigadier-Generals; and 137 Rear-Admirals.

Tabulation was first made of the age at which each of these officers attained each of the ranks in the service. Computations were then made showing the number of years spent by each officer at each rank. Medians and interquartile ranges were also computed.

AGE AND RANK IN THE ARMY

The records showed that during the Spanish-American War and the World War there were unusually rapid promotions. Many of these were only temporary. After the war a large number of officers were reduced to their former ranks and again were obliged to continue up the scale of promotions. In this investigation, temporary emergency promotions were disregarded and an officer was considered to have reached a given rank only when the commission was clearly a permanent one.

The data relating to the officers who reached the rank of Major-General in the Army are shown in A of figure 1. These officers reached the various ranks at the following median ages: Second-Lieutenant 23; First-Lieutenant 29; Captain 36; Major 45; Lieutenant-Colonel 50; Colonel 53; Brigadier-General 55; Major-General 60. The median age at which retirement took place was 63. Eighty per cent of the Army officers studied were married. The median age at marriage was 27 years. This is indicated on the ladder.

The length of time required to travel from the lowest step, Second-Lieutenant, to the highest step, Major-General, was on the average 37 years.

It will be seen from the vocational ladder that the promotions were relatively slow up to and including the rank of Major, occurring, on the average, about every seven years.

Toward the end of the career the promotions came more rapidly, at intervals of three or four years. This probably is accounted for in part by the fact that with advancing age many officers become disabled, die or reach the official retirement age, sixty-four, thus thinning out the ranks and making room for the more rapid advancement of others. In interpreting these ladders it should be recognized that the figures given are only medians, that is, the point above and below which 50 per cent of the cases fall. For example, although it would appear that these officers became captains at 36, some officers reached this rank a trifle earlier and some, a trifle later. In order to secure a true picture of conditions we must have a measure of variability showing to what extent the

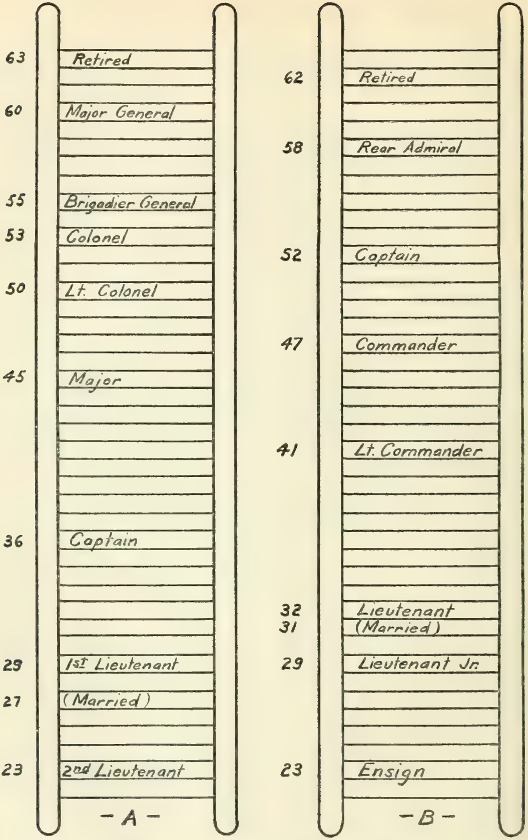

FIG. 1. SHOWING MEDIAN AGES AT WHICH SUCCESSIVE RANKS HAVE BEEN ATTAINED BY OFFICERS OF HIGHEST RANK IN THE ARMY AND IN THE NAVY

figures given are typical of the majority of cases. As such measures we have computed the semi-interquartile range and the coefficient of variability, (see table 1).

The variability is shown graphically (fig. 2) in terms of the absolute deviations of Q_1 and Q_3 from the median. These are the 25th and 75th percentile points, between which lie 50 per cent of the cases. The range above and below the median is quite small, the semi-interquartile range being from less than one year to 3.6 years. The variability is relatively small at the extremes; that is to say, almost all the men were between 22 and 24 on being commissioned Second-Lieutenant. The reason for this can be readily inferred. Similarly 50 per cent of those commissioned Major-General were between 54 and 60 at the time of such promotion,—again for obvious reasons. In the intermediate ranks there is greater variability, though the greatest, with Lieutenant-Colonels, is only 3.6. That is to say, 50 per cent of the officers were commissioned to this rank between the ages of 46 and 53.

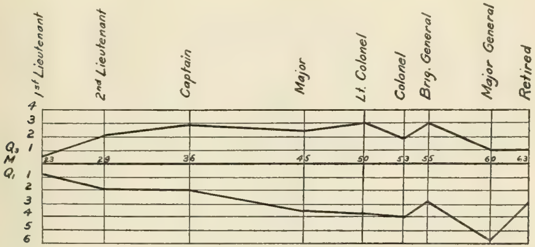

FIG. 2. ABSOLUTE DEVIATIONS IN YEARS OF Q_1 AND Q_3 FROM THE MEDIAN (ARMY)

EARNINGS OF ARMY OFFICERS

In order to obtain information about the earnings to be expected in a military career, recourse was had to the elaborate scale fixed by Act of Congress, June 10, 1922. This provides for an annual base pay for each rank which varies according to the length of service. The method by which alloted incomes were computed may be illustrated in terms of captains. The typical army history of these officers shows that at the time of receiving their commission as captain they had served thirteen years (from 23 to 36). Accordingly they would have begun their service as captain (under the present rate of pay) at $2880. To this would be added $960 rental allowance and $432 subsistence allowance giving a total of $4277. The regulations provide different allowances for officers with dependents from those without.

TABLE 1

Vocational histories of the living Major Generals of the United States Army (1926)

RANK	Q_1	MEDIAN	Q_3	SEMI-INTER-QUARTILE RANGE	COEFFICIENT OF VARIABILITY	PREDICTIONS FOR 50 PER CENT OF CASES	SALARY*
Second Lieutenant	22.7	23.6	24.3	0.8	3.4	23.5 ±0.8	B1500 R 480 S 216 2196
First Lieutenant	27.0	29.0	31.2	2.1	7.2	29.1 ±2.1	B2200 R 720 S 432 3352
Captain	34.1	36.1	39.1	2.6	6.8	36.7 ±2.6	B2880 R 960 S 432 4272
Major	41.1	45.0	47.4	3.2	7.1	44.3 ±3.2	B4050 R1200 S 648 5898*
Lieutenant-Colonel	46.1	50.1	53.2	3.6	7.2	49.7 ±3.6	B5075 R1440 S 648 7163*
Colonel	49.0	53.1	55.1	3.0	5.7	52.0 ±3.0	B6000 R1440 S 432 7872*
Brigadier-General	52.0	55.0	58.1	3.0	5.5	55.0 ±3.0	B6000 R1440 S 432 7872*
Major-General	54.0	60.0	61.0	3.1	6.1	57.1 ±3.1	B8000 R1440 S 432 9872
Retired	60.0	63.0	64.1	2.1	3.3	62.1 ±2.1	
Married	26.3	27.0	33.0	3.4	11.3	29.7 ±3.4	

* B = base pay; R = rental allowance; S = subsistence allowance. These are current rates and not the amounts necessarily received by living Major Generals when they had lower rank. "The maximum allowances which will accrue to an officer below the grade of Brigadier-General, to a Brigadier-General, or to a Major-General, will be such that the total of base pay, pay for length of service, and allowances for subsistence and rental of quarters will not exceed $7200, $7500 and $9700 respectively, per annum. Deduction of the necessary amount should be made from the rental allowances. The total of base pay and pay for length of service of an officer below the grade of Colonel may not exceed $5750 per annum."

The figures used here are based on the former scale since 80 per cent of these officers are married. After spending nine years as captain this "typical" officer reached the rank of Major when, similarly computed, his earnings would amount to $5898. (Reduced to $5750, see foot note to table 1.) Several advances in pay had occurred in the intervening nine years (see table 1).

AGE, RANK, AND EARNINGS IN THE NAVY

Rear-Admirals in the Navy reached the various ranks at the following median ages: Ensign 23; Lieutenant-Junior, 29; Lieutenant, 32; Lieutenant-Commander, 41; Commander, 47; Captain, 52; Rear-Admiral, 58. These facts are represented in B of figure 1. Seventy-nine per cent of the naval officers studied were married. The median age at marriage was 31. The median age at retirement was 62.

The length of time required to travel from Ensign to Rear-Admiral was on the average 35 years. As will be noticed on the vocational ladder the promotions in the Navy were fairly regular, occurring on the average about every six years.

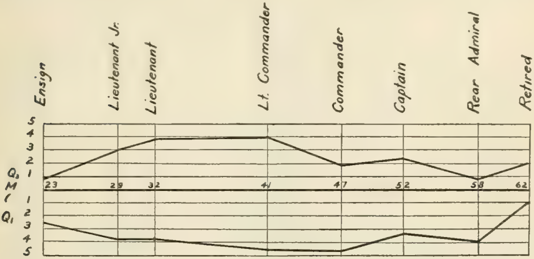

FIG. 3. ABSOLUTE DEVIATIONS IN YEARS OF Q_1 AND Q_3 FROM THE MEDIAN (NAVY)

The variability can be seen from figure 3 which shows the absolute deviations of Q_1 and Q_3 from the median, ranging from one year to 4.6 years. The greatest deviation is found at the rank of Lieutenant-Commander. Fifty per cent of the officers were commissioned to this rank between the ages of 36 and 45. In general the variability is slightly greater than that among the Army officers but in other respects it agrees with the conditions pointed out in the study of the histories of the Major Generals, being small at the extremes and larger at the intermediate ranks. The reasons are probably the same as those given in connection with the Army data.

Earnings computed in the same way as those relating to the Army officers, are shown in table 2. Computations are based on the amounts allotted to officers with dependents, since 79 per cent were married.

TABLE 2

Vocational histories of the living Rear-Admirals of the United States Navy (1926)

RANK	Q_1	MEDIAN	Q_3	SEMI-INTER QUARTILE RANGE	COEFFICIENT OF VARIABILITY	PREDICTIONS FOR 50 PER CENT OF CASES	SALARY*
Ensign	21.0	23.7	24.6	1.8	7.8	22.8 ±1.8	B1500 R 480 S 219 2199
Lieutenant Junior	25.1	29.1	32.2	3.6	12.3	28.7 ±3.6	B2200 R 720 S 438 3358
Lieutenant	28.1	32.1	36.2	4.1	12.5	32.2 ±4.1	B2640 R 960 S 438 4038
Lieutenant-Commander	36.1	41.1	45.2	4.6	11.1	40.7 ±4.6	B3900* R1200 S 657 5757
Commander	42.1	47.1	49.1	3.5	7.6	45.6 ±3.5	B4725* R1440 S 657 6822
Captain	48.2	52.1	54.6	3.2	6.2	51.4 ±3.2	B5800* R1440 S 438 7678
Rear Admiral	54.2	58.3	59.1	2.4	4.2	56.6 ±2.4	B6000–8000 R1062–1262 S 438– 438 7500–9700
Retired	61.0	62.2	64.3	1.7	2.6	62.7 ±1.7	
Married	27.3	31.1	36.1	4.4	13.7	31.7 ±4.4	

* B = base pay; R = rental allowance; S = subsistence allowance. These are current rates. "When the total pay and allowances exceed $7200, the rental allowances shall be reduced by the amount of the excess above $7200."

GRADUATES OF WEST POINT AND ANNAPOLIS

It is of interest to inquire whether the graduates of West Point and Annapolis had received their promotions more rapidly than non-graduates. Eighty-four per cent of the Major-Generals were West Point graduates, and eighty-five per cent of Rear-Admirals had been graduated from Annapolis. Scrutiny of the data showed that graduates and non-graduates who reached the top attained the various ranks at about the same ages.

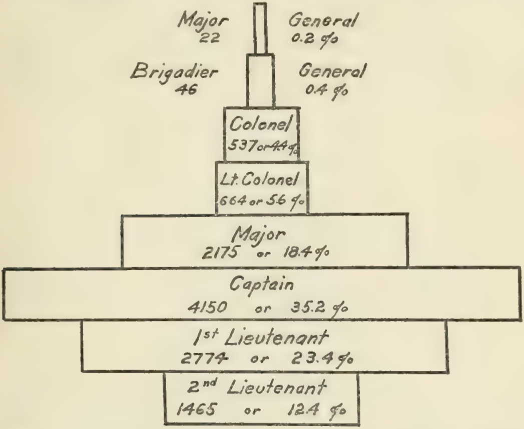

FIG. 4. DISTRIBUTION OF 11833 OFFICERS OF THE UNITED STATES ARMY (1926)

These figures have been kindly reviewed by the War Department and the Navy Department. The former state that: "The commissioned officers of the Army are distributed between the 'promotion' list and 'non-promotion' list. In the promotion list are carried the names of all officers in the Army, except officers of the Medical Department, Chaplains, and professors at the United States Military Academy. The non-promotion list includes all officers whose names are not borne on the promotion list. The age limits for appointment, and the promotion systems for the officers of both lists are different. For officers on the promotion list, promotion is determined by seniority up to and including the grade of colonel; and for officers on the non-promotion list, by length of commissioned service up to and including the grade of colonel. In both lists, promotions above the grade of colonel are made by selection."

As would be expected, relatively few of the officers in the non-promotion list are graduates of West Point; most of them are graduates of professional institutions such as schools of medicine, engineering, etc. But since our examination of the massed histories of the West Point graduates showed practically no deviation from those of the non-graduates, it seems reasonable to believe that in the long run and in the majority of cases the officers on the promotion list do not attain the generalship any earlier than officers on the non-promotion list.

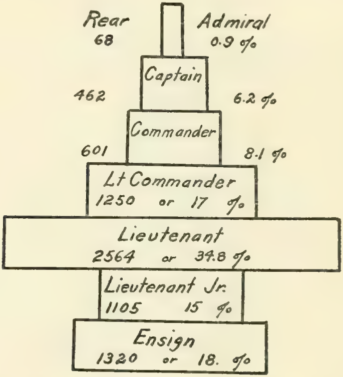

Fig. 5. Distribution of 7370 Officers of the United States Navy (1926)

The Navy Deparment informs us that the "staff corps (supply officers, surgeons, etc.) parallels the line, in promotion under recent law."

LIMITATIONS OF THIS METHOD

When figures such as these are shown, based on a study of the most successful persons in an occupation, the objection is raised that such figures show only the maximum levels of achievement, and do not reflect the history of the average persons in the occupation. It could be argued that in the military service, for example, the number who become generals is very small. This is true. The exact number and per cent at each rank authorized by Act of Congress, is shown in figures 4 and 5. One peculiar condition is revealed by these figures. We should expect that the number at each rank would be smaller as we proceed toward the top and that they would be graphically represented in the form of a pyramid. In both the Army and the Navy, however, the number of officers does not regularly decrease as one progresses from the lowest rank. Figures 4 and 5 show that the greatest number of officers in the Army are found, not at the rank of Second-Lieutenant, but at the rank of Captain; and in the Navy not at Ensign but at Lieutenant. As a matter of fact, 35 per cent of the officers in the Army are Captains and in the Navy 35 per cent are Lieutenants. Accordingly in giving vocational guidance to a youth we can inform him that the number of openings at least up to and including the rank of Captain or Lieutenant is relatively great. Laying aside the explanation of this condition, the fact remains that it is not true that the opportunities for promotion decrease regularly as one progresses toward the top. Though the number of openings is somewhat restricted in the upper ranks, they are not limited proportionately. Our figures show that as a matter of fact, promotion comes more rapidly at the upper ranks due, as was intimated, to retirements and deaths.

TABLE 3

Ages of Brigadier Generals and Major Generals when at lower ranks

RANK	BRIGADIER GENERALS			MAJOR GENERALS		
	Q_1	Median	Q_3	Q_1	Median	Q_3
Second Lieutenant	22.5	23.3	24.2	22.7	23.6	24.3
First Lieutenant	26.0	29.8	31.3	27.0	29.0	31.2
Captain	31.8	35.5	40.6	34.1	36.1	39.1
Major	41.3	45.7	47.3	41.1	45.0	47.4
Lieutenant Colonel	46.2	50.7	54.5	46.1	50.1	53.2
Colonel	49.8	52.2	57.6	49.0	53.1	55.1
Brigadier General	52.4	57.2	61.1	52.0	55.0	58.1

Though we grant some limitation of our method we can justify it further on the following grounds: In making a study of any occupation we should at all events ascertain the maximum opportunities open at the top. All young persons who are really ambitious fix their eyes on the ultimate goal they may achieve; and some of them will certainly reach it. They should be informed, then, concerning the highest possibilities and concerning the steps that were taken by men who have attained them. This fact alone justifies us in employing what might be called the historical method and charting the vocational histories of the leaders in a field.

Furthermore, to obtain the desired figures regarding all the workers in an occupation is extremely difficult. One can always find data regarding the leaders more easily than concerning the rank and file. For example, in the present instance, all the data concerning Generals and Admirals are published in *Who's Who in America*, but no facts are given concerning the officers of subordinate rank.

Even if we had data regarding all the officers now living, we should still not be able to draw valid conclusions showing exactly how long each one is going to remain at each rank, for at the moment when we made our investigation we would not be able to tell how long an officer who was then a Captain, for example, would remain a Captain.

A little light can be thrown on the representativeness of our figures by a subsidiary investigation which we carried out. By charting the records of the officers at the next rank below—Brigadier-General—would we find any different conditions? Such a tabulation was made, based on the records of 116 Brigadier-Generals. The result is shown in table 3. Here it is seen that the ages at which they attained the various ranks are almost identical with those at which the Major-Generals reached these ranks.

A further limitation of this method which is often pounced upon by objectors, is that the study of vocational histories gives a picture of conditions as they were in the past, but not of conditions that will exist in the future; at any rate, we can not be sure that the future will conform to that of the past. We must admit that conditions in the occupations change. For example, the earnings of these officers twenty years ago were different from the earnings current now. Again, the commission of Commodore has been abandoned in the Navy within the past twenty years. It is possible also that certain factors may enter in to modify the rate of promotion which a young man may expect during the next twenty years. In fact the Navy Department informs us that the present effort of the Department is in the direction of "establishing a fairly uniform career wherein seven years will be spent in each grade after the first two (Ensign and Lieutenant Junior Grade)." According to this plan the time required to travel from Ensign to Rear-Admiral would be 35 years. This still does not differ from the figures obtained in our study of vocational histories of Rear-Admirals.

Granting all this, however, the study of vocational histories is absolutely essential to an acquaintance with the trends of an occupation. This method is analogous to that used in statistical studies in business and industry. It is a vital principle of business that one needs to study past trends in order to plan intelligently for the future. And an adequate system of vocational guidance requires the application of this technique to the occupations.

SUMMARY

From this investigation we have derived facts which give a clear picture of the experiences of men who have been eminently successful as officers in the Army and Navy. Although they will not enable a vocational counselor to predict the future of any single individual, they do give some indication of the prospects. The data presented are not vague generalities but specific figures; not opinions but objective facts; not estimates but exact quantities. The assiduous application of this method will enable us ultimately to build up a body of knowledge that will be extremely valuable in administering vocational guidance.

(*Manuscript received March 15, 1928.*)

The Interview in Training Salespeople[1]

Techniques for Instruction Based on Errors, Ratings, and Service Shopping Reports

By Natalie Kneeland, *Research Bureau for Retail Training*

The possibilities of the personal interview as a method of training have been neglected. Miss Kneeland here describes the development of a technique for handling such interviews and for training interviewers in retail stores, as worked out by the Research Bureau for Retail Training, University of Pittsburgh.

A technique has been evolved for use of supervisors in interviewing salespeople about their ratings, their errors, and the reports made on their work by service shoppers.

In this article are listed eleven difficulties encountered by such interviewers of salespeople, ten characteristics of a successful interview on a rating or a service shopping report, qualifications of a successful interviewer, and general rules to observe for interviewing on ratings, on service shopping reports, and on errors.

The points covered in the technique developed on the basis of these data are outlined briefly under the three headings: preparation for interviewing, the interview itself, and follow-up.

IN RECENT years a great deal of stress has been laid, and rightly, on the importance of checking up on the results of training efforts. Much time and thought has been invested in the development of methods of measuring the effectiveness of training in specific situations. Very little has been done, however, about imparting the information thus found to the persons most concerned. That there is need for studying the best administration of training through these means of measurement has become more and more apparent. In department stores, for example, it has been found that excellent rating scales, service shopping and error reports, unless handled with utmost care, may result in far more harm than good to a department. These reports are so personal in nature that it requires a maximum of tact on the part of an interviewer to get the points over, in discussing them with the salesperson.

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[1] While the actual technique reported on in this study is for the exclusive use of member stores of the Research Bureau for Retail Training, and consequently is not available for general distribution, it is hoped that the description of the procedure may prove of interest and stimulate work along this line in other fields.

HOW THE STUDY DEVELOPED

The particular problem reported on in this study arose in connection with handling a rating scale which buyers and floormen used in rating their salespeople. Training directors handling the interviews with salespeople on these ratings were experiencing more or less difficulty in getting the material across with the maximum of efficiency and minimum of friction. For this reason, the *Research Bureau for Retail Training* undertook to investigate the situation for the purpose of working out a technique which interviewers might follow in handling such ratings. While working on this subject it was found that identical problems arose in handling interviews on service shoppings, reports, and errors. Consequently, the study was enlarged to include these training devices as well. The major part of the work was carried out by Miss Jane Spencer, a student of the Bureau, under the direction of the writer.

GENERAL PLAN OF THE STUDY

The plan of the study was to collect aims of interviewing, difficulties encountered by interviewers together with their solutions, current practices in interviewing, and the characteristics of successful interviews. From this material, techniques for handling interviews on the three training devices were worked out. They constitute Part I of the study. On the basis of the information obtained, it was then possible to prepare a training program for interviewers. This includes a discussion of the personnel responsible for interviewing, and actual training plans. The training plans are given in detail and include such items as the scope and administration of training, lesson plans, and devices for making training effective. This constitutes Part II.

DIFFICULTIES ENCOUNTERED BY INTERVIEWERS

Difficulties which interviewers meet in handling interviews with salespeople on ratings, service shopping reports or errors were obtained through interviews with training directors, personal observation of interviews with salespeople, and a questionnaire. The difficulties most frequently encountered were found to be the following:

1. Lack of interest and good sportsmanship on the part of salespeople over ratings, or shoppings.
2. The feeling on the part of the salesperson that the rater or shopper is prejudiced.
3. Resentment on the part of the salesperson.
4. Antagonism between the rater and the salesperson.
5. Danger of hurting the older employees who feel that they have worked tremendously hard and loyally for the store.
6. Salesperson's dislike of the rating scale or shopping report, because she feels that it may be the cause of her discharge.
7. Salesperson's feeling that no one has a right in business to discuss things of a personal nature.
8. The defense tendency and the habit of presenting an alibi.
9. Complete disavowal by the salesperson of the trait or fault imputed.

10. The feeling on the part of the salesperson that she is all right because she made a good bonus.
11. Giving constructive criticism without having the salesperson think that she is being criticized unfairly.

The solutions of these difficulties were made the basis of the technique developed as the major portion of the study.

AIMS OF INTERVIEWS

At the same time that the difficulties and solutions were being collected, information was also being secured regarding the purpose or aim of the interviews and the characteristics of a successful interview. The purpose of the interviews may be summed up in the following three-fold aim: to encourage the salesperson to improve or to keep up her present high standard; to find out the cause of her deficiencies, if she has any; and to offer her concrete aid for improvement.

Ten characteristics of a successful interview on a rating or a service shopping report were mentioned:

1. It should give definite, concrete help for correcting weaknesses indicated.
2. It should encourage the salesperson to correct her shortcomings.
3. It should encourage the salesperson to keep up her high standard on those points on which she has been rated or reported high.
4. It should be handled with tact.
5. It should be handled by a person of maturity.
6. It should show the relation between a poor rating or report and poor results obtained.
7. It should make plain the fact that the rating or report is not final but only contributes to the information of the individual about herself.
8. There should exist, on the part of the interviewer, a sympathetic understanding of the person interviewed.
9. There should be an understanding, on the interviewer's part, of the conditions under which the salesperson works.
10. There should be an understanding, on the part of the interviewer, of the rating scale or shopping blank and how the rating or shopping report is made.

The qualifications set down for a successful interviewer on errors emphasizes the corrective nature of her job a little more forcibly. For such interviewing the following are necessary: a helpful attitude; tact; fairness; ability to get the salesperson's point of view; firmness; and friendliness.

The interview itself must be concrete, short, and have teaching value. The interview must also be held in private. In addition, the salesperson must be kept in a receptive mood, and be made to see the seriousness of salescheck errors.

The five traits which were stated as most essential for any interviewer are tact, including kindness; understanding and sympathy; quickness of perception; firmness; patience and self-control. These traits were made the basis of one of the lesson plans in the training for interviewers in which the trait actions were discussed somewhat in detail.

GENERAL RULES TO OBSERVE IN INTERVIEWING

On the basis of the information obtained, the following general rules for interviewing on ratings and service shopping reports were drawn up:

1. Remember that the aim of the interview is not to reprimand but to

encourage the salesperson to increased effort.
2. Find out all you can about the salesperson before interviewing.
3. Analyze the rating or report before interviewing.
4. Try to maintain an unbiased point of view.
5. Definitely attempt to establish a friendly contact at the beginning of the interview.
6. Be sure that the salesperson understands the rating or report.
7. Give the salesperson a general idea of her standing or an idea of the report as a whole at first.
8. Be sure to point out the good points of the rating or report and commend the salesperson on them.
9. Attempt to discover the cause of the weaknesses or poor service indicated.
10. Offer constructive advice for improving the weak points and strengthening the good points.
11. Provide opportunity for the salesperson to express her opinion during the interview.
12. Terminate the interview on a pleasant, encouraging note.

The general rules for interviewing on errors again emphasizes the corrective element a little more strongly. These rules are:

1. Conduct the interview in a friendly, constructive manner.
2. Remember that it is just as important to encourage the salesperson not to repeat the error as it is to get the error corrected.
3. Try to find out why the salesperson made the error.
4. Remember that the salesperson must know why what she did was wrong if she is to avoid repeating the error.
5. Be sure that she knows exactly what she should have done.
6. Be sure that she understands the trouble, delay, and expense caused by errors.
7. Close the interview on a note of encouragement.

POINTS COVERED IN THE TECHNIQUE OF INTERVIEWING

The technique of interviewing on the three types of training is divided in each case into three phases: preparation for interviewing, the interview itself, and follow-up. The following outline indicates the points covered for interviewing on ratings. This follows closely the technique worked out for interviewing on service shopping reports.

Preparation

1. Familiarize yourself with the salesperson's records.
2. Familiarize yourself with the selling situation.
3. Know how the rating is made.
4. Plan the interview carefully.

The Interview

5. Establish a friendly relationship.
6. Introduce the subject of ratings.
7. Take up the points on which the rating is high.
8. Mention the sales record.
9. Take up the points on which the rating is medium or low.
10. Offer definite aid to improvement.
11. Close on a note of encouragement.

Follow-up

12. Follow-up by means of the next rating.
13. Interview the salesperson on the floor.
14. Call the salesperson back.

Each of the topics listed above is discussed at some length. The following excerpts will give an idea of the type of content included.

Ex.—4. Plan the interview carefully

"Arrange to hold the interview as early in the day as possible, before both you and the person to be interviewed are tired.

"Hold the interview in a private place.

"Allow enough time for the interview so that you will not feel hurried. An interview on a rating scale should be a personal talk. If it is to have any value, the salesperson must have an opportunity to express her grievances and offer her alibis. If you are hurried she can see it, and will react to it.

"Decide how you will conduct the interview, with the individual to be interviewed in mind."

Ex.—5. Establish a friendly relationship

"Do not keep the salesperson to be interviewed waiting.

"Invite her to sit down in a manner which indicates that you expect the talk to be pleasant."

Ex.—9. Take up the points on which the rating is medium or low

"Point out her weaknesses, as shown in the rating, to the salesperson, and make clear any that she does not understand.

"Make an effort to find out why the salesperson thinks she had been rated low in these respects.

"If her rating of herself agrees with that of the other raters, ask her why she thinks she is poorest on these points. If she does not know, suggest reasons until you find one that she thinks might be correct.

"If the rating she made disagrees with the others, and she thinks she has been rated unjustly, call her attention again to the fact that the ratings were made by more than one person. Stress the importance to her of the opinion of those with whom she works. Ask her if she knows any reason that might lead the raters to think she is not good in the respects indicated. Suggest possible reasons. Try to make her feel that you want to help her get at the cause, not that you are trying to persuade her to admit something that she is holding back. If she continues to think the ratings are unjust, tell her that she may be quite right, but ask her to pay special attention to the things in which she has been rated low, and see if she can discover any reason for the rating. Tell her that perhaps she is creating a false impression by some small thing that she could correct easily."

Ex.—13. Interview the salesperson on the floor.

"Make it a point to have a short talk with each salesperson on the floor, and ask her how she is progressing and whether or not the suggested aids for improvement are proving helpful."

TRAINING FOR INTERVIEWERS

The section on training interviewers was prepared for the use of the training director or supervisor of service. The personnel to be trained,—that is, the interviewers,—may be training directors themselves, training supervisors, employment managers, buyers or assistant buyers, and, in the case of error follow-up, floormen.

The training is to be given by means of discussion in small informal groups, or individually. The training program includes discussion plans for four meetings. The first meeting is given over to a discussion on the advantages of personal interviewing as a training method; the second on psychological principles of learning which interviewers may use; the third on the qualities of a successful interviewer; and the fourth on the particular interview procedure under discussion. The discussion plans include content and method of procedure. In addition to these plans the following devices for varying the training procedure are suggested: a demonstration interview; difficult problems, presented in the form of situations; a sample case for discussion and the use of a file accessible to all interviewers, in which each one places difficulties which she has encountered, together with the solutions.

SUMMARY

This study carries the subject of personal measurements one step farther than is usually attempted, in that it outlines the procedure for getting across the results of these measurements to the persons most concerned. Furthermore, it anticipates the difficulties which may be encountered in performing this task by providing the necessary technique in the form of a series of lesson plans prepared especially for training the persons who will be called upon to do the interviewing.

The actual practical value of the material is yet to be tested by use. Since, however, the interview procedures are based on a combination of the most successful current practices and on those solutions of difficulties which seem to be most effective, it is believed that their use will help the interviewer solve many of his problems. Since they are presented in a form as direct and concise as possible, it should be simple to follow them. The discussion plans for interviewers' meetings were worked out in detail, with the aim of the interviewers in mind, and it is felt that the training director can use them as they are presented, or can adapt them to his own purposes. Each device suggested has been used with success in some store, so that its practical value is fairly assured.

Finally, if this study should do no more than arouse interest in the problem of satisfactorily utilizing personal measurements in training, it will have performed a much needed function.

(Manuscript received October 8, 1928.)

News Notes

PROGRESS OF THE BRITISH NATIONAL INSTITUTE OF INDUSTRIAL PSYCHOLOGY

The April number of the British quarterly *The Journal of the National Institute of Industrial Psychology* contains a full report of the activities of the Institute during the year 1928.

One of the most interesting features is a graph showing the growth of investigations as measured by receipts for services to business firms. These fees for professional services to industry have more than doubled in the last three years,—in 1928 amounting to over $85,000. This rapid increase appears to be due to two factors: (a) the very satisfactory manner in which the staff of the Institute carries out its investigations and the practical value of the results received by industry; (b) the excellent organization and publicity methods of the Institute.

The staff includes a total of 61 persons of whom 42 are paid investigators and research workers. It is interesting to note that of the nearly $100,000 disbursed during the year 1928 only about ten per cent was used for salaries and expenses incidental to the prosecution of the Institute's research program. Some research is doubtless also undertaken in connection with each commercial investigation; and in these investigations the Institute constantly makes use of the results of the research studies of the Industrial Fatigue Research Board.

The report gives a brief description of investigations made during the year in 29 industrial organizations. "These investigations" to quote from the published statement "have covered many aspects of industrial organization, including the layout of factories, the sequence of processes, the selection of appropriate employees, the elimination of waste of effort, material and time in production, and the attainment of greater efficiency and contentment of the employees by improved working conditions."

It is interesting to make a comparison for the purpose of determining in what direction the Institute has increased its activities. For this purpose the investigations described may be grouped under four main headings. A comparative tabulation of the description of these activities for the years 1926 and 1928 shows:

	1926	*1928*	*Increase*
(1) Management	21	24	3
(2) Personnel	2	11	9
(3) Safety	0	2	2
(4) Working Conditions	1	6	5

It is pleasing to those interested in personnel activities to note that the increase in technical services rendered to industry during the last three years has been in work in which the primary concern has been the welfare of the individual workers rather than in those activities which are more directly concerned with profits for the management. The amount of activity involving what is called improvements in management must not of course be taken as an indication that these activities have entailed any hardship or increased fatigue to workers. The training and leadership of the staff guarantees this.

The National Institute may in fact be regarded as a pioneer in obtaining a staff of university trained psychologists for the purpose of investigating and advising executives on matters of construction, planning and business organization. Its all round development and the speed of its growth must give great satisfaction to the Director and his staff, not only because they thus know of the excellence of their work, but also because they are supplying a service essential to the reconditioning of British industry.

C. S. Slocombe.

FELLOWSHIP AWARDS FOR PERSONNEL RESEARCH

The Social Science Research Council has announced the award of twenty-eight fellowships for advanced study and research during the next academic year. Three of these, because of the topics chosen for investigation, are of special interest to readers of the PERSONNEL JOURNAL.

Elmo P. Hohman will make a comparative study of American and European seagoing labor in the twentieth century, with special reference to the operation of the La Follette Seaman's act.

Earle L. Rauber, University of Chicago, will study the electrification program and labor legislation in actual practice in Czechoslovakia, Austria and Russia.

Keith Sward, University of Minnesota, will make an experimental study of leadership. His headquarters will be at Stanford University.

1930 CENSUS SUGGESTION

The Committee on Governmental Labor Statistics of the American Statistical Association has submitted to President Hoover a plan for securing factual data on the extent of unemployment. It suggests that two queries be incorporated in the 1930 census: (1) "Are you now unemployed?" and (2) "Are you employed but on a lay-off without pay?" Nationwide replies to these questions would furnish specific information, as opposed to estimates made on a basis of yearly variations in payroll, of the number of unemployed workers in the United States. The adoption of this proposal is dependent on Congressional action on the Census Bill as amended by the Senate committee on commerce.

A NEW REVIEW

The *Revue de la Science du Travail* is the first periodical in the French language to be devoted exclusively to technopsychology. Its field is "the physiology and psychology of work and the prospects for its rational organization." Volume 1, No. 1 bears the date of March, 1929. It will appear quarterly under the joint imprints of the *Librairie Alcan*, Paris, and *Goemaere*, Brussels. The *Revue's* founders and directors—a psychologist, a physician, and an engineer—are drawn from three countries: J. M. Lahy, France; Dr. P. Sollier, Belgium; and J. P. Arend, Luxembourg. It has an ambitious program successfully launched in its excellent first number. In addition to original articles and general reviews in the field of its major interest, it presents reports of new procedures, advances and trends in technopsychology, and accounts of activities and organizations at home and abroad. The book reviews and periodical abstracts are most comprehensive. They make up nearly one third the content of the 179-page initial issue. The leading articles in the March number are: "Present problems of scientific management in world industry," by J. P. Arend; "Vocational psychology and the selection of apprentices," by J. M. Lahy; "Is prediction of perfectibility of motor aptitudes experimentally possible?," by Dr. P. Sollier and J. Drabs; "The cost of mental disorder in industry," by Dr. Toulouse; "Electrophysiology and the science of work," by Dr. H. Laugier; "Measurement of expenditure of energy in muscular work: Principles of the respiratory method according to recent studies," by Mlle. B. Neoussikin; "Ergology or the science of work," by Dr. P. Sollier; "Psychological profiles in vocational selection and guidance," by J. M. Lahy; and "Technopsychology in vocational adjustment in Germany: The Regional Institute for the Study of Occupations at Dusseldorf," by Dr. W. Schultz.

A supplement lists the table of contents of the most recent issues of fourteen journals. There is also a bibliography on Individual Differences in Educability, conveniently printed for clipping and transfer to library reference cards.

The PERSONNEL JOURNAL feels confident in predicting that the publication and circulation of the *Revue* will give added impetus to the international movement for the scientific study of work.

FORMS OF EMPLOYMENT CONTRACTS

Inquiry by National Civic Federation

What else besides work does one agree to give his employer when he takes a job?

What, in other words, besides an agreement as to work and pay, is involved in the modern work contract?

The National Civic Federation, through a Study Committee of its Commission on Industrial Inquiry, has set about to answer these questions. Several hundred representative business establishments throughout the country have received requests to submit to the Federation confidential information regarding their employment contract practices. Many have already replied and each mail brings additional answers, all of which are being carefully analyzed.

A preliminary survey revealed the fact that the employment contract is not the same in all industries or sections of the country. The National Civic Federation is interested to learn what differences exist, what historical or other explanations lie back of them, and whatever else will shed light on the purposes and present usefulness of existing types of contractual relations between American employers and employees.

The Study Committee in charge of this investigation is headed by Mr. Sam A. Lewisohn. The other members of the Committee are: C. S. Ching, Lincoln Cromwell, Henry S. Dennison, E. K. Hall, Michael J. Keough, Thomas McMahon, Marcus M. Marks, Charles P. Neill, Herman Oliphant, Almerindo Portfolio, and Arthur H. Young.

The Director of the Study is E. R. Burton, author of "Employee Representation."

"The employment contract," says the Committee's statement as to the purpose and scope of its inquiry, "has two broad aspects. Its primary phase concerns the work to be done and the wage to be paid for such work. In the second place, the contract contains various special or collateral provisions governing or modifying the primary matters of work and wages. Sometimes these special provisions are set forth in rules and regulations posted in the shop or printed in a rule book, it being assumed that each employee who continues on the job after learning of these rules accepts employment under the conditions thus laid down. Where there is a trade agreement with a union, the trade agreement becomes a statement of certain usages of the business; and in some cases the courts have considered these usages as collateral provisions of the individual employment contract.

"In some companies when a person applies for a job, he is required to sign one or more printed statements or agreements regarding these special collateral terms of his employment. These may be printed on the application blank, the employment record card or separately. In some cases if the employee rents a company house, the lease which he signs contains provisions which affect indirectly his rights with reference to his job."

It is the collateral provisions of the employment contract—not the specific terms as to rates of wages or number of hours of work—with which The National Civic Federation's inquiry is concerned. The preliminary survey has brought to light a wide variety of such modifying provisions of the individual employment agreement. Among the more significant are those relating to deductions from wages for dues to some specified organization to which the employee agrees to belong, or for contributions to the cost of a pension or insurance plan; payment of wages in some form other than money; assignment of wage claims; purchase of occupational or domestic supplies from some specified source; harboring in a company house persons whose presence may be objectionable to the employer; membership in labor organizations; concerted action against the employer for the purpose of altering existing terms or conditions of employment; divulging trade or industrial secrets; assignment of patent rights to inventions made by the employee; and recognition of certain specified acts as legitimate grounds for discharge.

Often offsetting obligations which the employee assumes, there are definite duties which the employer undertakes to perform. Such provisions relate to payment of bonuses for continuous, satisfactory employment; advance notice of dismissal (except in cases of discharge for cause); recognition or non-recognition of a union; procedure for adjustment of differences, including, in some cases, arbitration; furnishing "clearance cards" to employees upon leaving; and a variety of other matters.

It is believed that the particular provisions of the employment contract will be found to differ according to industrial and local conditions. Information is being sought not only from employers but also from trade union officials and from the officers of numerous employers' associations in order that every bit of evidence may be discovered as to the advantages and disadvantages of the various provisions considered from the standpoint of broad social effects as well as with reference to practical business requirements.

MORTAR BOARD PERSONNEL PROGRAM

The National Council of *Mortar Board*, college honorary society for senior women, which selects its members on the basis of service, scholarship, and leadership is conducting a personnel study, national in scope. Mrs. A. C. Ramier, of Indianapolis, Indiana, as chairman of the personnel committee, has developed four lines of vocational inquiry, namely:

1. Ascertainment of the extent to which personnel work exists in the forty-three colleges having Mortar Board chapters;
2. Compilation of a directory of agencies located outside the college campus which are interested in personnel work;
3. Survey made by Miss Irene Rems, former national vice-president, of the vocational qualifications and choices of Mortar Boards graduating in 1928, which will be repeated for the class of 1929;
4. Surveys of vocational opportunities for college girls in the larger cities. Miss Mary Margaret Kern, now Editor of the *Mortar Board Quarterly*, made the first survey last year, using Chicago as the subject of her investigation. Miss Margaretta Fenn of Northwestern University personnel department coöperated with her. At the present time surveys of Philadelphia, New York City, Minneapolis, Cleveland, Baltimore and Detroit are in progress.

In addition, Mortar Board assisted with the Woman's World Fair of Chicago on Vocational Day in May, 1928, and intends to do so again this year.

The local Mortar Board chapters are starting vocational libraries, compiling records of vocations entered by their graduates, helping new students to adjust themselves, bringing vocational speakers to the campus, and working toward the establishment of personnel departments in those universities and colleges not providing this service.

I. R. I.

The International Industrial Relations Association has prepared for distribution to individuals and organizations interested in membership, a full statement of its aims and purposes from an international point of view with an added note on the particular significance of the organization for members in the United States.

The second section of the report on "Fundamental Relationships between all Sections of the Industrial Community" has also been sent to members. This volume of over four hundred pages is distinguished both in format and typography, and no less in content,—furnishing as it does the verbatim account in English, French and German of the Cambridge proceedings of the First Triennial Congress of the I. R. I., held in England in July, 1928.

Non-members may purchase either Vol. I (reports from eighteen countries presented to the Congress), or Vol. II (the actual Congress proceedings) for $1.25, and $1.75, from the Secretariat, 66 Javastraat, The Hague, Holland.

AIDS TO PERSONNEL RESEARCH

G. H. Estabrooks and J. F. Smith have furnished us with the following report of a method of handling data, in use in the personnel department at Colgate University: "The procedure here outlined is an attempt to point out certain labor saving techniques in the study of college personnel problems. Most small institutions are placed in somewhat the same position as is Colgate. Financial support of the personnel department is restricted and while every possible encouragement is given for branching out in new and original fields, a sharp eye must also be kept on the budget.

"If original research is to be done under these conditions we must watch our expenses at three points. First, we will use mostly those tests and measures which have a nation wide reputation, unless there is definite reason to the contrary; secondly, we must get the data from these tests collected in the most convenient possible form; and thirdly, we must have this worked up rapidly by untrained labor.

"Our first point will be of interest only in that it points out a means for collecting data. Our entire Freshman class are given the following tests: 1. The Intelligence Test for College Freshmen as prepared by the American Council on Education; 2. The Colgate Mental Hygiene Test, Personal Inventory B-2 (for psycho-neurotic traits); 3. Personal Inventory C-2 of the same series (for introversion-extroversion); 4. The Pressey X-O Test; 5. The Ascendence-Submission Study of the Allports; and 6. The Vocational Interest Blank of E. K. Strong, Jr. We happen to use this series because of our particular interests. Other institutions would prefer a different combination.

"Our second suggestion is possibly of broader application. This consists of a record form containing all the essential information for several research problems. It might if one may use the term be called a research psychograph, and is designed to supply certain information in its most concise shape. Fig. 1 shows the present form.

"Entrance requirements standings, arranged in quartiles by the Dean of Admissions, are entered in the first column. Only scholastic standing is here considered and there is naturally a certain subjective element in this particular rating.

"Intelligence according to results on the test prepared by the American Council is entered in the second column. Actual percentile scores are recorded.

Ent. Req.		Int.	Grades				A-S	C_2	B_2	Pressey X-O Types			Mental Hygiene	Athletics				Ex-Curr. Activ.				F
			1	2	2	4				T. A.				1	2	3	4	1	2	3	4	
Q_1											F											
											D											
Q_2											SF											
											S											
Q_3											H											
											P											
											M											
Q_4											N											
											I											

FIG. 1. GRADES, TEST SCORES AND RATINGS. INDIVIDUAL RECORD FORM USED BY COLGATE UNIVERSITY PLACEMENT BUREAU

"The next column gives us spaces for grades over the entire four years. Gross scores in terms of quality points are here used,—black ink, for the first semester, red for the second.

"*A-S* gives us the percentile ranking of the particular student in the Ascendance-Submission Study.

"C_2 gives the same for introversion and B_2 for psycho-neurotic traits on the Colgate Mental Hygiene tests previously mentioned.

The Pressey *X-O* test is entered in detail. Total affectivity according to percentile rank goes in the first column while the gross scores on the particular traits in fear, disgust, etc. go after these letters in the next column.

"Mental hygiene as a heading is introduced immediately after these scores because we hope to find some relation between Pressey *X-O* or C_2 and personality difficulties. In this space are entered, in very annotated and symbolic form any breaches in discipline, behavior peculiarities or other points which may come under the heading of mental hygiene. Quartile ranking will be practically worthless here.

"Needless to say there is a big subjective element in the next three columns. In athletics we have to rely on the opinions of the gymnasium authorities. Participation in varsity and intramural athletics, along with the general gymnasium record are of use here.

"Extra-curricular activities again introduce a subjective element. Managerships of various sports, membership on the staffs of student publications, activity in band or glee club and other campus activities are all considered in this rating.

"Finally, *F* stands for fraternity. On our campus we have a pretty sharp hierarchy in fraternities. Moreover about one half of our student body belong to no fraternity, while perhaps one half of this neutral body are in a strong Commons club. This makes rating here comparatively easy.

"Compilation of this material on such a blank takes a surprisingly short time once it has been collected. Student help can then rapidly transfer it to distribution tables, after which it is a simple matter to apply statistical treatment. Such a technique not only gives a definite saving in time and expense but also suggests problems simply by accumulating data in such a way that possible trends are easily recognized."

SMITH COLLEGE

The Institute for the Co-ordination of Women's Interests at Smith College is offering for the first time a Summer Institute, to be held from June 26th to July 17th. The courses are designed to give the results of the four years' study made by the Institute for the Co-ordination of Women's Interests. The principles of co-ordination, of vocational adjustment, and of mental hygiene in family life will be considered and discussed, and there will be demonstrations of practical methods in household organization.

TAYLOR SOCIETY POSTPONES SPRING MEETING

Because of current unrest in the textile trade, the major industry of the South, it was deemed advisable to postpone the meeting of the Taylor Society, announced for May 1 and 2, in Charlotte, N. C. Although realizing that the situation in many respects made it a favorable time for the discussion of management on the basis which it is the purpose of the Society to promote, the action of postponement was taken as a means of avoiding the introduction into the planned discussions of factors of possible misunderstanding, involving the distinction between scientific management and efficiency systems.

MINNESOTA'S SESSION FOR SELF-APPRAISAL

The University of Minnesota during its coming summer term will again conduct the "Session for Self-Appraisal" offered last summer as an experiment. The "Session" is described as an attempt to help young people answer these three questions: (1) Do I want to go to college, or could I profit more from some other type of special training? (2) If I go to college what should be my line of study and interest? (3) What vocation should I most seriously consider as I prepare for my life's work? Registration for this intensive six weeks course was limited to 150 specially selected boys and girls who are being graduated this year from high schools throughout the state of Minnesota.

FORTHCOMING MEETINGS

The Personnel calendar schedules the following meetings for the early part of the summer:

June 12–25. SOUTHERN COLLEGE PERSONNEL CONFERENCES. Annual. Blue Ridge, N. C.

June 18. PHILADELPHIA PERSONNEL ASSOCIATION. Final Meeting.

June 19–21. INTERNATIONAL MANAGEMENT CONGRESS. Paris.
June 19–22. SOCIETY FOR THE PROMOTION OF ENGINEERING EDUCATION. Annual Meeting. Columbus, Ohio.
June 26–July 3. NATIONAL CONFERENCE OF SOCIAL WORK. San Francisco.
June 30–July 5. NATIONAL EDUCATION ASSOCIATION. Atlanta.

PERSONAL ITEMS

Dr. DONALD A. LAIRD, Director of the psychological laboratory at Colgate University, has been appointed technical adviser to Eric C. Kunz, executive manager of Givaudan-Delawanna, Inc., manufacturers of chemical aromas with factories in Geneva, Lyons, and Passaic, N. J.

Dr. WILLIAM T. ROOT, professor of psychology in the University of Pittsburgh since 1920, will become head of the department of psychology on July 1, 1929, succeeding Professor J. H. White, who has resigned as head in order to devote all of his time to the new division of research in personality problems.

Dr. FRED C. SMITH, Editor of the Vocational Guidance Magazine, has recently been named to succeed Miss Miriam Carpenter as Appointment Secretary at Harvard Graduate School of Education.

Book Reviews

PERSONNEL AND LABOR PROBLEMS IN THE PACKING INDUSTRY

By Arthur H. Carver. Chicago: University of Chicago Press, 1928. Pp. 226

PROFITABLE PERSONNEL PRACTICE

By Henry Bruere and Grace Pugh. New York: Harper & Brothers, 1929. Pp. 454

REVIEWED BY EDWARD S. COWDRICK

Since 1923, the University of Chicago, in coöperation with the Institute of American Meat Packers, has offered a series of courses designed primarily for executives and employees in the packing industry. Mr. Carver's book doubtless was intended mainly as a text for use in these coöperative courses. It contains specific information in regard to the meat industry and much of its illustrative material is derived from packing house practice. Nevertheless, the book is of sufficiently universal application to make it of service to the general reader and a useful addition to the tool chest of a personnel director in any industry. Mr. Carver brings to his task a successful experience in industrial education and personnel administration. His book gives evidence of thoughtful observation of causes and trends in labor management.

Within only a little more than two hundred pages, it is not to be expected that every branch of the whole science of industrial relations would be given fundamental or thoroughgoing treatment. The author has found it necessary to use a selective process and to lay the greatest emphasis upon those aspects of the subject which he considers most important for his immediate purpose. The chapters on recruiting, employment and placement are satisfactorily adequate. The treatment of wages, salaries, and financial incentives is somewhat more casual. The discussion of employee representation, while comparatively brief, is carefully thought out and gives an understandable outline of the representation movement, particularly as it has affected the packing industry. There are intelligent discussions of education, training, and foremanship.

Mr. Bruere and Miss Pugh would be the last to contend that *Profitable Personnel Practice* presents a fundamental discussion either of theories or of methods in industrial relations. On the contrary, they explain in their preface, it "is not intended so much to present a philosophy of industrial relations as to provide a practical reference book for the man of affairs." The book is in fact mainly a compilation of material collected by the Policyholders Service Bureau of the Metropolitan Life Insurance Company. On each of the topics treated, information is given regarding the practices of various representative corporations and this information sometimes is supplemented by forms, records, and other illustrative data, and by quotations from men directly concerned in the administration of labor policies. The detailed and concrete character of this material gives the book value, particularly to the employer seeking guidance in the initiation of a modern labor policy.

In their effort to furnish suggestions and to point out sources of information and assistance, the authors do not hesitate to recommend organizations or even individuals, and occasionally they come close to the border of gratuitous advertising. The text is marred by numerous errors indicative of inexcusable carelessness in either editing or proof reading.

WAGE ARBITRATION, SELECTED CASES, 1920–1924

By George Soule. New York: The Macmillan Company, 1928. Pp. 294

Reviewed by Arthur Howard Sutherland

The preparation of this book was undertaken by the Labor Bureau, Inc., by agreement with the Workers' Education Bureau. It shows the workings of an arbitration board in hearings on wage disputes. Each case is treated in the following manner: (1) question stated; (2) union argument; (3) employers' argument; (4) argument on access to books and records; (5) union rebuttal argument; (6) employers' rebuttal argument; (7) decision of arbitrators.

Four cases in the printing trades, a case in one of packinghouse trades, three railroads, and four garment trades disputes are covered. The introduction points out some of the differences in conduct of an arbitration board as compared with court procedure.

CAREERS

By Esca G. Rodger. New York: D. Appleton & Company 1929. Pp. 186

Reviewed by Arthur Howard Sutherland

Boys will find this book interesting and illuminating. It tells of the opportunities and difficulties of occupations, and the teller is a leader in the field. William Allen White is interviewed regarding the opportunities in journalism; Dr. William J. Mayo tells of the present opportunities in medicine. There are authoritative statements regarding the occupations of farming and teaching, business at home and abroad salesmanship, law and engineering. The author has done a good job of interviewing and of writing the account of her interview with each celebrity, making the result worth while for the young American boy.

AN OUTLINE OF CAREERS FOR WOMEN: A PRACTICAL GUIDE TO ACHIEVEMENT

Doris E. Fleischman, Ed. Garden City, N. Y.: Doubleday, Doran, 1928. Pp. 514

Reviewed by Bessie Bunzel

Careers for Women contains forty-three chapters, each of which is written by a women who has achieved marked distinction in some special line of activity. The book aims to help the young worker just starting her business life to select that type of work which seems to offer her the greatest scope for personal satisfaction, as well as to provide her with a means of livelihood. It presents practical information concerning the various professional, industrial and commercial opportunities open to intelligent and ambitious women in America. From it we get an idea of the temperamental requirements and intellectual abilities which any given occupation demands; the training necessary in order to achieve success; the consecutive steps in progress to be anticipated; and the rewards and ultimate goals to be won. It should also prove valuable to the woman who has already chosen her vocation, since from it she is likely to gather many interesting tips applicable to her own work. On the whole, the book is a most interesting compilation, written by women obviously having the greatest enthusiasm for and delight in their work; it bears witness that women have already gained positions of real prominence and responsibility in a vast variety of business enterprises.

But in spite of the undoubted success which these women have achieved, they admit in almost every case, that there still exist very substantial handicaps against the woman worker, even though theoretically she is no longer barred from entering freely into the professional and business life of our day. Doris Fleischman, the editor of the book, sums up this side of the situation succinctly in her extremely interesting chapter on Public Relations, where she points out that the special problems confronting the gainfully employed woman "are purely psychological, and based on the definite amount of prejudice that remains in many men's minds against the effectiveness of women in the commercial and industrial world. This usually is combatted by convincing men through intelligent handling of problems, and not by slaying the dragon of anti-femininism." And in most cases, throughout the book, when discrimination is discussed the comments made are equally good-humored. As opposed to this acquiescence in the *status quo*, Marcia Mead sounds a distinctly militant note in her chapter on architecture and states that her own "chief difficulties have not been that I could not do the work, but that the minds I have had to deal with were unable to grasp the idea of working with a woman." At the same time, it is apparent that she, above all the other women writing in this book, shares the prejudices of her male confreres and thinks there is some justification for the predominant male attitude. Nevertheless, Miss Mead's chapter is most stimulating and contains a point which one would expect to encounter far oftener than one does, namely, that a thorough knowledge of English and a constant study of languages are essential for success, even in work apparently far removed from niceties and subtleties of style. It seems to this reviewer, likewise, that it is the common inability to express one's ideas in forceful, concise and polished English, and with some degree of literary distinction, which vitiates so much of our current scientific work. The writing of many scholarly treatises is so feeble, undistinguished and dull that all except technicians are discouraged from reading them; as a consequence, valuable information lies unknown and sterile.

As is to be expected, the chapters are unequal in merit, though on the whole, they are adequate. At the same time, certain ones stand out distinctly as being above the general high level. Such for example, is the sincere, straight-forward chapter on "Child Welfare" by Dr. S. Josephine Baker and the excellent one on "Literature" by Gertrude Atherton. Although it is one of the most difficult subjects to handle, because the requirements for a successful literary career are vague and intangible, rather than specific and clear cut, it offers a vivid illustration of the difference between mere competency and brilliance.

As against its many admirable qualities, one word of criticism must be voiced. Unfortunately the book does not fulfill the promise on the cover that "it is a practical guide to achievement." Its principles are for the most part vague and general; they constitute no workable formula for gaining a foothold on the top rungs of the ladder. The book merely touches the high spots in a number of given occupations; but it points inevitably to a conclusion which we had reached long ago—that success is almost always entirely dependent upon personal ability and initiative.

INCENTIVES TO STUDY

By Albert Beecher Crawford. New Haven, Conn.: Yale University Press, 1929. Pp. 206

REVIEWED BY ARTHUR HOWARD SUTHERLAND

This volume is an analysis of the results of a questionnaire filled out in 1926 by approximately 50 per cent of the students of Yale University, with the support of a students committee comprised of representatives of the classes of 1926, 1927, 1928, 1929.

The questionnaire confronted the student with detailed inquiries about his educational background, reasons for choosing courses, judgments as to the value of courses, personal expenditures of time and money, choice of vocation, and the like.

Among the results of the analysis are the following:

1. Yale men differ widely in mental ability, and there is very little relation between the time spent in study and the ability of the student.
2. The student body divides into two groups as regards money allowances: those who have large allowances and those who are self-supporting. Conditions at Yale seem to have eliminated the middle group of fairly sufficient financial allowance from home.

   Self-supporting students in general spend more time in study and receive better grades than does the other group. This is not due to differences in mental ability.
3. Sons of non-college graduates make in general as good records as do sons of college graduates. Sons of professional men make records in general better than sons of business men.
4. Those who enter college with a purpose, or who achieve a purpose early, make better records than do those who wait till graduation to decide on a future career. Those planning to enter a profession are better academic risks than are those looking toward business.

Summarizing the first portion of the book, the author believes that the outstanding criterion of success in college is purposive motivation. Students in Sheffield Scientific School where purposes and aims are generally vocational and professional prefer the required courses; while students in Yale College prefer electives. Courses out of line with a major subject, and required by the college in the interest of broader culture, fail to yield intellectual breadth as intended, since they lack the purposive motivation which is a constant incentive in the major, or in the vocational course.

There is a variety of incentives to profit by the opportunities offered at Yale, according to the students' reports. It is significant that these incentives evolve in larger degree, from—not the classroom—but extra curricular activities. The correlation of grades and mental ability among those who engage in extra curricular activities is .46; of those not in such activities .30.

The advantages of leisure and wealth do not inspire students to scholastic effort. Some self-supporting students have time for extra curricular activities and show a correlation of grades to mental ability of .49—as against .44 for the non-self-supporting group. Self-supporting students who are not in activities correlate .33—as compared with .29 for the non-self-supporting. Football players show the highest index of marks to mental ability; while the highest marks go in general to those who devote themselves to dramatics, debating and music clubs. The average variation however makes the figures of doubtful value.

Suggestions from this study are significant. The author holds throughout to the belief that the cultural studies are of great value but points to the fact that the students do not know and do not appreciate this value. Success on the part of the instructor in charge of a class is dependent to a degree upon bringing these values within the comprehension of students and discovering a means of developing motivations and other cultural incentives within the subject matter taught.

AN OUTLINE OF SOCIAL PSYCHOLOGY

By J. R. Kantor. Chicago: Follett Publishing Company, 1929. Pp. 416

SOCIAL PSYCHOLOGY: THE PSYCHOLOGY OF POLITICAL DOMINATION

By Carl Murchison. Worcester, Mass.: Clark University Press, 1929. Pp. 210

REVIEWED BY ARTHUR HOWARD SUTHERLAND

It is the purpose of an outline to define and delimit a field of inquiry. Professor Kantor attempts this for Social Psychology by noting the distinguishing characteristics of problems which other social sciences customarily refer to psychology. Assuming that social sciences are a unit with no cleavages, Social Psychology then cannot be set off as a separate discipline. It will find its problems in each of the social sciences and aim to be a helping science using its own techniques and viewpoint.

Psychological phenomena arise in the interactions of persons and stimulus objects. Whenever a thing, person, condition or situation elicits common responses from two or more persons, the group is formed as a fluid collectivity (lasting only so long as the thing has appeal); and the thing, person, condition or situation may be said to possess a psychological attribute (its capacity to elicit group response). This attribute may or may not be named, but is of a non-physical sort, illustrated by the mammal which to one group possesses the attribute "unclean," to another the attribute "sacred."

Such a stimulus object, by reason of the common group response, is said to be institutionalized. The peculiar interest of Social Psychology, therefore, is in the responses to institutionalized stimulus objects.

Terms commonly used by other social sciences take on a new meaning for Social Psychology. Stimuli are not perduring or static attributes of objects, in the belief of the author. An advertising slogan may for a time be institutionalized, but lose its appeal and be discarded. A sociological group is relatively perduring—*e.g.*, a tribe, a profession, a board of directors. But when a group is in process of institutionalizing some new object, it can no longer be regarded from the same point of view. For some purposes the group solidarity is maintained. For the new purpose the group divides, some favoring, others opposing, some dropping out, others taken in. The group is fluid. The point of view of Social Psychology therefore diverges from that of the other social sciences in the use of some of the common concepts.

It seems to the reviewer that this delimitation may be interpreted too narrowly. Habit formations and modifications, together with the conditions under which these phenomena occur, are certainly within the province of psychology. When the group is responding by following the line of habits, by switching to another set of habits, by forming new habits, or by making novel responses which if continued might lead to the formation of habits—the behavior of the group and the peculiar quality of the stimulus object are interesting to psychology. In other words, the genetic point of view assumes, as a matter of methodology if for no other reason, a scientific approach to establish facts which may be used to determine progress or growth.

The author's viewpoint is that groups are essentially sociological. As groups they are of interest to the Social Psychologist only so far as they reveal a psychological problem. When a group has acquired or is acquiring a shared or common response to definite stimulational value, there is a psychological problem. The Social Psychologist is prepared to find an interest in groups of any size, from two persons to many. He will therefore wander over the field of all the social sciences as a specialist with a limited interest.

Professor Murchison in his book undertakes from an excellent outline to define the field of Social Psychology; but so many irrelevant impulsions crowd upon him along the way that his expository flight gives the impression of rashness and immaturity.

BORN THAT WAY

By Johnson O'Connor. Baltimore: Williams & Wilkins, 1928. Pp. 310

Reviewed by Harry D. Kitson

This book with its challenging title represents the earnest search of one man for something which, since the time of William James, most psychologists have given up hunting for—the soul. The tools with which he conducts his search are tests with pins, numbers and blocks, which in the words of the author "constitute the wrappings of that strange something which makes an individual, and is sometimes called the soul."

The author starts out with a discussion of the inheritance of physical characteristics such as color of eyes, and then applies this mechanism to the inheritance of mental characteristics such as mechanical aptitude, clerical aptitude and the like.

In support of such reasoning the author offers the facts: (1) that on tests such as those just mentioned individuals show marked variations, differing from each other more widely than they differ from each other with respect to physical features; (2) that on repeated testings these persons retain similar positions with respect to these mental traits; therefore these mental characteristics must be inborn.

This concept which Mr. O'Connor presents very interestingly is one that should be examined carefully for it is held by a number of psychologists and personnel workers who though they might disclaim the rather bald formulation just made, still follow it implicitly or "subconsciously."

In examining it we should ask three questions: 1. Is there such a thing as a general abstract mental trait, for example, mechanical aptitude? 2. Can it be measured by a test (for example, the wiggly-block test)? 3. Is the mental trait passed down from parent to offspring in the way that for example blue eyes are?

As to the first of these questions, neither Mr. O'Connor nor any other investigator has proved that such mental traits exist (with the controversial exception of intelligence). On the contrary the best psychological teaching of the past fifty years has been leaning away from it. The so-called faculty psychology of the early nineteenth century has been discredited by the experimental work of the twentieth century. Human reactions are now regarded as specific, not general. One is surprised, therefore, to hear Mr. O'Connor in 1928 testifying to a belief in (shades of Gall and Fowler!) "an inclusive faculty which may be called *symbol sense*."

Another consideration would be brought forward by the behaviorist who asserts that in applying a test to a human being the only thing we measure is a unit of *behavior*; that to interpose a "mental trait" such as "mechanical aptitude" or "clerical aptitude" is unwarranted.

This points to an answer to our second question. Merely to *assert* that a test measures a given mental trait is not proof that it does so. It has been pointed out repeatedly by psychologists of the past generation that a test measures merely what it measures. And to assert that the wiggly-block test or the number checking test measures "mechanical aptitude" or any of the other "elusive mental traits" for which Mr. O'Connor is seeking is gratuitous assumption. In arguing that his tests measure mental-vocational aptitudes, Mr. O'Connor presents as proof that the measures he gets are distinct from general intelligence. As a matter of fact, when we scrutinize his figures we find grounds for believing that the test is really another intelligence test. For (as shown in the figures facing page 35) the vocational groups he tested stand in a hierarchy as follows: engineers, draftsmen, and mechanics. Surely this is an intelligence hierarchy indicating that the wiggly-block test, if it measures anything, tests intelligence.

But the most serious difficulty in believing that this or any other test measures mechanical aptitude is that no criterion of mechanical aptitude has been furnished. What is mechanical aptitude,—aptitude for mechanical activities? But they are so various, ranging from gross activities such as running a steam roller to such delicate manipulations as assembling a watch. And just because a person is "handy" in the one is no assurance that he will be handy in the other.

The criterion Mr. O'Connor used was presence in a group of engineers, draftsmen, or mechanics. He has not shown, however, that these men had anything in common by way of mentality. The things they were doing were, according to his own statement, exceedingly diverse: designing, constructing (things as various as houses and sewers), working with sheet-metal, etc. Now while in loose speech we class many of these as mechanical activities, we have no grounds for asserting that there is a common *psychological* stratum underlying them. And until some one finds these grounds we can never justifiably call a test a test of mechanical aptitude. Indeed it is just as reasonable to hold that there is no such thing as mechanical aptitude as to maintain that it exists.

Let us now examine the third question, namely that special occupational aptitudes are inherited. True, Mr. O'Connor uses the word "inborn," but if a trait is inborn it must have been inherited as blue eyes are inherited. He describes the mechanism as follows: "The chromosomes . . . . are the mechanism by which physical characteristics are believed to pass from generation to generation. It is a long way from the germ cell to the number checking and the block assembly, and yet considerable evidence . . . . leads to the belief that, with full knowledge and understanding of the germ cell and the forty-eight tiny particles which it encloses, one might predict, with considerable accuracy, the initial speed with which the mature individual would check the numbers and assemble the nine wiggly blocks."

The factual material on which Mr. O'Connor asks us to accept this doctrine is that on successive re-testings with any one of his tests, persons tend to stand in the same relative position, and prolonged periods of training do not change materially the relative positions. (As a matter of fact this tendency is not so high. The correlation between two parts of his "Work Samples," Number One, page 95, is only .74—not a very high index of reliability.)

This can not be accepted as evidence that the alleged trait measured by the test is inborn. To prove that, one would be obliged to obtain the reaction to the test of individuals representing successive generations. Perhaps such proof were too much to demand, since, according to hypothesis (the author makes much of the Mendelian laws), an individual might inherit a trait from any one of his thirty-two great-great-great grandparents, who could not well be summoned to the laboratory by any single investigator.

The question at issue is not whether the Mendelian and other biological laws govern the inheritance of mental things, but whether they govern the inheritance of mechanical, clerical, and other occupational behaviors. Now, the behaviorist is strenuous in insisting that occupational activities are products of experience or at least overwhelmingly affected by it.

Rather than to explain aptness in mechanical manipulations on the grounds of inheritance we ought to use the Law of Parsimony, and never ascribe a phenomenon to inheritance until we have tried all simpler explanations. A behaviorist would suggest many things that might explain why certain persons stand high in mechanical tasks and others do not. A Freudian would find the reason in some early experience, perhaps as early as the sixth month.

The author's argument from similarity of test performance after repetition and practice does not hold consistently, for he gave his test to two individuals, one who performed the operation in thirty seconds, another in thirty minutes. Both then repeated the test twenty times. The first did not change his score, having already attained the maximum speed. The second, however, after twenty trials, "reproduced the accomplishment of the other so well that a new-comer, entering the laboratory after the twentieth lesson, could not have distinguished the slow analyst from the fast." This makes the test appear to be not a test of anything innate but of an acquired skill.

As will have been gathered from the foregoing discussion, Mr. O'Connor's book consists of the description of the way in which he has used instruments which he calls Tests for Clerical Aptitude, Tests for Mechanical Aptitudes, Tests for Finger Dexterity, Tests for Tweezer Dexterity, Tests for Group Contact or Retiring Personality. With these tests he has selected employees who do good work in a factory and has weeded out those who are not likely to do good work.

The book is divided into two parts, the first 159 pages consisting of mystical musings and the last 147 pages consisting of an Appendix containing descriptions of the tests, directions for administering them, and tables and charts showing the standings of the subjects who have been measured by the tests.

Mr. O'Connor commands praise by presenting all his figures so that the reader can interpret them for himself, or repeat the investigations by way of re-checking. We also commend the interesting and readable style of the text. Free of involved technical terms, it is written so that the intelligent layman can find pleasure in reading it. But the thirty pages beginning with 167 contain veritable vocational prescriptions of a nickel-in-the-slot order which would be severely censured by a practical vocational counselor.

The most valuable feature of the volume to investigators, is Appendix III, pp. 227–310, containing tables of frequency of the word-reactions given by 2000 persons to each of the 100 stimulus words of the Kent-Rosanoff series. Mr. O'Connor publishes in convenient reference form the frequencies originally obtained by Doctors Kent and Rosanoff, side by side with his own data from 1000 subjects, permitting many significant comparisons.

Whether or not one agrees with Mr. O'Connor's brand of vocational psychology, one must take seriously the fact that by means of these tests he has been able to select persons for the manufacturing establishment where he has been employed who do better work than those who do not stand so high in his tests. As a practitioner, then, he has performed a genuine service to the field of employment. He would have made a better contribution if he had not undertaken to defend the thesis of his title: "Born That Way."

EXPLORING YOUR MIND WITH THE PSYCHOLOGISTS

By Albert Edward Wiggam. Indianapolis: Bobbs-Merrill Company, 1928. Pp. 419

Reviewed by C. J. Ho

One of the social sciences which the general public understands least, perhaps is psychology. Psychology has grown from the academic soil and, except in industry, little application has been made outside of the educational field. Yet in everyday life there has never been a greater need for psychology than there is today. As society becomes more and more complex, individuals find it increasingly difficult to adjust themselves to life situations. The only solution is better understanding of the principles of human behavior. The need has long been recognized for making the discoveries in psychology better understood by the layman, but the attempt to do so has somehow been delayed. Therefore, Mr. Wiggam's presentation of psychology in everyday language meets a timely need and should be given a welcome by both the psychologist and the layman.

Mr. Wiggam's new book consists of a series of interviews with prominent psychologists. To students of psychology, most of the material is familiar. It begins with Thorndike on how the mind works. The theory is clearly and yet quite accurately expounded. Terman's study of bright children is told as interestingly as is possible with such technical material. Seashore's study on musical ability is presented with its practical applications. Dr. Cattell's account of the development of psychology should be of value to those interested in psychology. While all this may be very familiar to students of the science, this perhaps is presented to the public for the first time in an understandable and readable manner.

The studies on personality by Laird and Adams are perhaps of questionable value. All psychologists are more or less interested in this subject. Some have attempted to determine the nature of personality and to devise means of measuring it but so far none has been able to find anything of great validity. While all the personality rating scales may contribute to the development of a generally accepted standard measurement of personality, they must be said to be still in the stage of experimentation. They are interesting and suggestive, but it may be dangerous if the material is accepted without discrimination by the untrained reader. Perhaps it is because of the popular interest in personality and the general demand for something practical that Mr. Wiggam presented such studies at their face value.

Mitchell's report of his experience in mental adjustments should be helpful in everyday life. May and Hartshorne's study on character tests, and Miles' study of historical genius, both throw light on some of the current problems in psychology. But if one wishes to be strictly scientific one must accept their results with reservations. Contrary to the author's opinion, the reviewer does not feel that it is appropriate to include Dr. Pupin's discourse on science and religion with psychological studies. The presentation of the psychological material does not give one the feeling that psychology is taking men away from God; and there is no need in this connection for reassuring the reader to the contrary.

The book is attractively written and is a good example of what the author calls "scientific journalism." Most of the material is presented as answers to Mr. Wiggam's stimulating and well directed questions. The personality of each psychologist is brought out so vividly by the dialogue that the reader can feel the presence of the speaker. All in all, even though the author admits that it is not a systematic and complete presentation of psychology, it is a very serviceable book. To a student of psychology, it gives a different presentation of what he has studied in text-books. To the public, it gives information, much of it practical. To those who are interested in making science human, or making human beings more scientific, the book serves as a very good example of the necessary technique.

MODERN PSYCHOLOGY: NORMAL AND ABNORMAL

By Daniel Bell Leary. Philadelphia: J. B. Lippincott Company, 1928. Pp. 453

REVIEWED BY HENRY E. GARRETT

It is difficult to discover any very good reason for this tedious and poorly written book. Certainly it has little to offer either as a textbook for students or as a popular exposition of psychology for those in search of new thrills. To follow the author as he sets out to study the genesis and development of personality, or in his own words to build up "a behaviorism of personality," it is necessary to toil through four "Parts" or sections and more than 400 pages in which there is little new either in material or in form of exposition. Probably the treatment of psychoanalysis and of the theories of Freud, Jung, Adler, and Kempf are the most satisfactory parts of the book; out these are by no means outstanding.

The mechanical make-up of the book is in keeping with its contents. Page follows page of closely written prose without a single table or illustration to break the monotony. There is practically no citation of exact experimental results; instead discussion and more discussion, argument and generalization. The bibliographies at the end of the chapters are reasonably satisfactory, but in many instances footnote references are so all-inclusive as to be practically useless. Thus, reference may be made to five or six authors by name only, as on page 133 where the reader is invited (besides Watson) to "compare" Platt, Titchener, Rignano, Broad, and Piéron; while in another place (page 129) he is referred to Titchener "in general." Would not it save space to refer the reader once for all to the Encyclopaedia Britannica? On page 157 Wiggam is cited as the authority on "correlated traits,"—which is dealt with in a page and a half.

The book gives one the impression of having been hastily and somewhat carelessly written. Many sentences are too long and too involved grammatically, while the author splits his infinitives with distressing regularity. Put in brief, this volume is simply another in that already too-long list of semi-popular "general" books on psychology, the main result of which to date has been to cheapen psychology and (sometimes) enrich the writer.

STANDARDS AND STANDARDIZATION

By Norman F. Harriman. New York: McGraw-Hill Book Company, 1928. Pp. 265

Reviewed by Arthur Howard Sutherland

"Standardization can be overdone" says the author. But the trend of the times, the requirements of consolidations and superconsolidations in industry, and increasing intolerance as to waste everywhere, indicate that much further effort at effective standardization will be expended.

Twenty countries have national standardizing bodies. The British Engineering Standards Association, organized for the purpose of furthering British industry and trade, has 420 committees, and the services without fee of some 2000 engineers and business men. The National Bureau of Standards of the United States is organized in 9 departments. A new development is the work of recent years in the standardization of commercial products. This group provides a friendly meeting place for producers, distributors and consumers. An International Bureau of Weights and Measures has been organized since 1875.

The book is devoted to physical standards, and to standardization of measurable qualities and characteristics of commodities and their measuring devices. It is an interesting, encyclopedic presentation of the present status of standardization work. The introduction is by Mr. Samuel M. Vauclain.

WHAT IS THE MIND?

By George Thomas White Patrick. New York: The Macmillan Company, 1929. Pp. 193

YOUR MIND IN ACTION: APPLICATIONS OF PSYCHOLOGY

By Fred A. Moss. Boston: Houghton Mifflin Company, 1929. Pp. 487

Reviewed by Arthur Howard Sutherland

Shall Mind be regarded as a more or less inert and perhaps negligible result of physical and chemical processes? Shall it be studied as an immediate and present fact? Or shall it be studied in relation to its own creations and products,—as seen in inventions, constructions, literary, and artistic products? Dr. Patrick believes that the weight of evidence at present tends to push forward the claims of the latter point of view; that evolution is a creative process, and that Mind or Intelligence is the biological instrument by which civilization and its phenomena have come to pass. Behaviorism does not cover the field, in his view, but is a useful adjunct to other methods. He predicts that Behaviorism will eventually return to the fold, and that it may even assume the forms of idealism rather than its present materialism.

Dr. Moss, however, takes the view that Human Behavior is generally and specifically determined. Insufficient emphasis has been given to the effects of climate, altitude, and rays above and below the spectral limits. Sleep versus sleeplessness; fatigue versus alertness; hunger versus repletion; disease versus health,—represent conditions which have causes. Immediate effects can be seen, and to a degree differentiated, after taking drugs.

Individual differences are traceable to race, family, age, sex, training, other past experience peculiar to the individual, and especially to emotional outlets which have been found and habituated in each individual. The result is a complex but not highly integrated individual; and in consequence a complex and very slightly integrated society. The author's discussions emphasize the abnormal rather than the normal applications of psychological interests.

New Books

INDUSTRIAL AND LABOR RELATIONS

Davison, Ronald C. *The unemployed; old policies and new.* New York: Longmans, Green & Co., 1929. 305 p. $4.00.

Dunn, Robert Williams. *Labor and automobiles.* New York: International Publishers, 1929. 224 p. $2.00.

Hiller, E. T. *The strike.* Chicago: University of Chicago Press, 1928. 304 p. $2.50.

Jacks, Lawrence Pearsall. *My neighbor the universe; a study of human labor.* New York: G. P. Putnam's Sons, 1929. 114 p. $1.50.

Lauck, William Jett. *The new industrial revolution and wages.* New York: Funk & Wagnalls Co., 1929. 317 p. $2.50.

Meakin, Walter. *The new industrial revolution; a study for the general reader of rationalisation and post war tendencies of capitalism and labor.* New York: Brentano's. 284 p. $3.00.

Morris, M. C. A. *The British workman, past and present.* New York: Oxford University Press, 1928. 174 p. $2.50.

National Industrial Conference Board. *Industrial relations programs in small plants.* New York: Author, 1928. 55 p. $1.50.

Nussbaum, Arthur, ed. *International year book on civil and commercial arbitration.* Vol. 1. New York: Oxford University Press, 1928. 434 p. $4.25.

Rayner, Robert M. *The story of trade unionism, from the Combination Acts to the General Strike.* New York: Longmans, Green & Co., 1929. $2.50.

Thompson, Laura Amelia, comp. *Injunctions in labor disputes; select list of recent references.* Washington, D. C.: Government Printing Office, 1928. 19 p. Gratis.

Ware, Norman. *The labor movement in the United States, 1860–1895; a study in democracy.* New York: D. Appleton & Co., 1929. 427 p. $3.00.

World Peace Foundation. *Industry, governments and labor.* Boston: Author, 1928. 250 p. $2.00.

VOCATIONAL INFORMATION AND VOCATIONAL GUIDANCE

Bezanson, Anne. *Earnings and working opportunities in the upholstery weavers trade in twenty-five plants in Philadelphia; an experiment in cooperative research.* Philadelphia: University of Pennsylvania Press, 1928. 150 p. $2.50.

Brown, Lela T. and Irwin, Robert B. *Insurance underwriting; a study of the business in its relation to blind agents.* New York: American Foundation for the Blind, 1928. 52 p. 50¢.

Cohen, I. David. *Principles and practices of vocational guidance.* New York: Century Co., 1929. 494 p. $3.00.

Coyle, Grace L. *Present trends in clerical occupations.* New York: Womans Press, 1928. 44 p. 75¢.

Crawford, Albert Beecher. *Incentives to study; a survey of student opinion.* New Haven, Conn.: Yale University Press, 1929. 206 p. $5.00.

Ernst, Clayton Holt, and White, Trentwell Mason, eds. *Opportunity ahead!* New York: D. Appleton & Co., 1929 ('22–'29). 195 p. $1.50.

Hall, Herbert James, and Knox, Mertice Macrae Buck. *Handicrafts for the handicapped.*, rev. ed. New York: Dodd, Mead & Co., 1928. $2.50.

Jackson, Dugald C., Jr., and Jones, W. Paul. *The profession of engineering.* New York: John Wiley & Sons, 1929. 124 p. $1.50.

Jones, Jane Louise. *A personnel study of women deans in colleges and universities.* New York: Teachers College, Columbia University, 1928. 155 p. $1.50.

Parker, W. E., and Moyer. D. H. *Vocational information; a bibliography for college and high school students.* Ann Arbor: University of Michigan Press, 1928. 50¢.

Persons, Warren Milton. *The construction of index numbers.* Boston: Houghton, Mifflin Co., 1928. $1.25.

Rudisill, Earl Stockslager. *The intimate problems of youth; a series of studies of youth and their leaders.* New York: Macmillan Co., 1929. 217 p. $2.00.

Stetson, Fred Lea, and Huffaker, C. L. *Pupil counseling in grades seven to twelve.* Eugene: University of Oregon Press, 1928. 21 p. Apply.

Stewart, Estell May. *Apprenticeship in building construction.* Washington, D. C.: Government Printing Office, 1928. 138 p. 20¢.

U. S. Federal Board for Vocational Education. *A course in farm shop work for teachers of vocational agriculture.* Washington, D. C.: Government Printing Office, 1928. 13 p. 5¢.

U. S. Library of Congress, Division of Manuscripts. *Notes on the care, cataloguing, calendaring and arranging of manuscripts; 3d edition.* Washington, D. C.: Government Printing Office, 1928. 47 p. Gratis.

Williams, Marguerita P., and Hammer, Lee F., comps. *Directory of training courses for recreation leaders.* New York: Russell Sage Foundation, 1928. 69p. 50¢.

Yale University Department of Personnel Study. *The choice of an occupation.* New Haven, Conn.: Author, 1929. 227 p. Apply.

EDUCATION

Bixler, Harold Hench. *Check lists for educational research.* New York: Teachers College, Columbia University, 1928. 130 p. $1.50.

Clark, Harold Florian, comp. *The economic effects of education as shown by statements of economists.* Bloomington, Ind.: University Bureau of Research, 1928. 39 p. Apply.

Cox, Philip, W. L., and others. *Objectives of education; second year book of the National Society for the Study of Educational Sociology.* New York: Teachers College, Columbia University, 1929. 191 p. Apply.

Department of the Interior, Bureau of Education. *Biennial survey of education, 1924–1926.* Washington, D. C.: Government Printing Office, 1928. 1207 p. $2.30.

Douglass, Harl R., and others. *Controlled experimentation in the study of methods of college teaching.* Eugene: University of Oregon Press, 1929. 50 p. $1.00.

Dudgeon, M. S. *The worker and the library.* Chicago: American Library Association, 1929. $1.50 per 100 copies.

Eddy, George Sherwood, ed. *Am I getting an education?* Garden City, N. Y.: Doubleday, Doran & Co., 1929. 92 p. $1.00.

Giddings, Franklin Henry. *The mighty medicine; superstition and its antidote; a new liberal education.* New York: Macmillan Co., 1929. 147 p. $2.50.

Gray, William Scott, and Munroe, Ruth. *The reading interests and habits of adults; a preliminary report.* New York: Macmillan Co., 1929. 318 p. $3.50.

Hart, Joseph Kinmont. *A social interpretation of education.* New York: Henry Holt & Co., 1929. 478 p. $4.50.

Harry, David P. *Cost of living of teachers in the state of New York.* New York: Teachers College, Columbia University, 1928. 190 p. $1.75.

Henig, Max Solomon. *Safety education in the vocational school; the construction of a curriculum for accident prevention.* New York: National Bureau of Casualty & Surety Underwriters, 120 West 42d Street, 1928. 116 p. $1.40.

Jones, Lange, G. E. *Negro schools in the southern states.* New York: Oxford University Press, 1929. 160 p. $3.50.

Linscheid, Adolph. *In-service improvement of the state teachers college faculty.* New York: Teachers College, Columbia University, 1928. 100 p. Apply.

Marshall, Leon Carroll, ed. *The collegiate school of business; its status at the close of the first quarter of the twentieth century.* Chicago: University of Chicago Press, 1928. 477 p. $4.00.

Mecredy, Mary Florence, ed. *Developments in part-time education in California.* Berkeley: University of California Press, 1928. 32 p. Apply.

Monroe, Walter S., and others. *Ten years of educational research, 1918–1927.* Urbana: University of Illinois College of Education, 1928. 367 p. Apply.

National Education Association. *Can the nation afford to educate its children?* Washington, D. C.: Author, 1928. 34 p. 25¢.

National Education Association. *Can the states afford to educate their children?* Washington, D. C.: Author, 1929. 40 p. 25¢.

National Society of College Teachers of Education. *Current educational readjustments in higher institutions; 17th yearbook.* Chicago: University of Chicago Press, 1928. 183 p. $3.00.

Payson, Verna M., and Haley, Alice H. *Adult education in homemaking.* New York: Century Co., 1929. 268 p. $2.25.

Reals, Willis Howard. *A study of the summer high school; with a detailed analysis of the achievement in two summer high schools.* New York: Teachers College, Columbia University, 1928. 94 p. $1.50.

Rockefeller Foundation, Division of Medical Education. *Methods and problems of medical education.* New York: Author, 1928. 386 p. Apply.

Shultz, Irwin Tabor. *A descriptive and predictive study of a class in a school of education.* Philadelphia: Westbrook Publishing Co., 1928. 131 p. Gratis.

Strebel, Ralph F., and Morehart, Grover C. *The nature and meaning of teaching.* New York: McGraw-Hill Book Co., 1929. 266 p. $2.50.

U. S. Federal Board for Vocational Education. *Coöperative part-time education; the* *present status of coöperative schools and classes in the United States.* Washington, D. C.: Government Printing Office, 1928. 42 p. Apply.

Williams, Lewis Ward. *Supply and demand as applied to high school teachers.* Urbana: University of Illinois, 1928. 11 p. Apply.

Wood, Thomas Denison, and Lerrigo, Marion O. *Teaching how to get and use human energy.* Bloomington, Ill.: Public School Publishing Co., 1928. 135 p. 75¢.

Woodring, Maxie Nave, and others. *Enriched teaching of science in the high school.* New York: Teachers College, Columbia University, 1928. 385 p. $2.75.

Wright, J. C., and Allen, C. R. *Efficiency in Education.* New York: John Wiley & Sons, 1929. 400 p. $3.00.

Zachry, Caroline B. *Personality adjustments of school children.* Introduction by William Heard Kilpatrick. New York: Chas. Scribner's Sons, 1929. 319 p. $1.80.

SOCIOLOGY

Anderson, Nels, and Lindeman, Eduard C. *Urban Sociology.* New York: A. A. Knopf, Inc., 1928. 426 p. $3.25.

Cleveland, Frederick A, ed. *Modern scientific knowledge of nature, man and society.* New York: Ronald Press, 1929. 618 p. $4.50.

Hopkins, Mary Della. *The employment of women at night.* Washington, D. C.: Government Printing Office, 1928. 91 p. 15¢.

Herring, Harriet L. *Welfare work in mill villages; the story of extra-mill activities in North Carolina.* Chapel Hill: University of North Carolina Press, 1929. 417 p. $5.00.

Kelso, Robert Wilson. *Poverty.* New York: Longmans, Green & Co., 1929. 382 p. $2.00.

Landman, Issac, ed. *Christian and Jew; a symposium for better understanding.* New York: Horace Liveright, 1929. 383 p. $3.00.

Lasker, Bruno. *Race attitudes in children.* New York: Henry Holt & Co., 1929. 410 p. $4.00.

Lobsenz, Johanna. *The older woman in industry.* New York: Chas. Scribner's Sons, 1929. 297 p. $2.50.

McGill, Nettie Pauline. *Children in street work.* Washington, D. C.: Government Printing Office, 1928. 362 p. 50¢.

Robinson, Claude E. *Child workers in two Connecticut towns, New Britain and Norwich.* New York: National Child Labor Committee, 1929.

Randall, John Herman, Jr. *Our changing civilization; how science and the machine are reconstructing modern life.* New York: Frederick A. Stokes Co., 1929. 369 p. $3.00.

Simon, Ernest Darwin. *How to abolish the slums.* New York: Longmans, Green & Co., 1929. 158 p. $1.80.

Spalding, Henry Stanislaus. *Social problems and agencies.* New York: Benzinger Bros., 1929 (new and enl. ed.). 612 p. $2.50.

ECONOMICS

Benn, Sir Ernest John Pickstone. *The return to laisser faire; the foundation of prosperity.* New York: D. Appleton & Co., 1929. 221 p. $2.00.

Bittner, G. E. *Analyzing retail selling time; cost of selling commodities over the retail counter.* Washington, D. C.: Government Printing Office, 1928. 15 p. Gratis.

Dron, Robert W. *The economics of coal mining.* New York: Longmans, Green & Co., 1928. $4.20.

Herring, E. Pendleton. *Group representation before congress.* Baltimore: Johns Hopkins Press, 1929. $3.00.

Herzog, Peter W. *The Morris plan of industrial banking.* Chicago: A. W. Shaw Co., 1928. 136 p. $2.00.

Klein, Julius. *Frontiers of trade; foreword by Herbert Hoover.* New York: Century Co., 1929. 343 p. $2.50.

Matsushita, Shutars. *The economic effects of public debts.* New York: Columbia University Press, 1929. 186 p. $3.00.

McCahan, David. *State insurance in the United States.* Philadelphia: University of Pennsylvania Press. 307 p. $3.50.

Mlynarski, Felixs. *Gold and central banking.* New York: Macmillan Co., 1928. 157 p. $2.00.

National Industrial Conference Board. *Cost of government in the United States.* New York: Author, 1929. 120 p. $3.50.

Sloan, Laurence Henry. *Corporation profits; a study of their size, variation and use, and distribution in a perid of prosperity.* New York: Harper & Bros., 1929. 374 p. $3.50.

Thom, W. T. Jr. *Petroleum and coal; the keys to the future.* Princeton: Princeton University Press, 1929. 241 p. $2.50.

Voskuil, Walter H. *The economics of water power development.* Chicago: A. W. Shaw Co., 1928. 237 p. $3.00.

INDUSTRY

Alexander, Magnus Washington. *Mechanization of industry and economic and social progress.* New York: National Industrial Conference Board, 1928. 56 p. Apply.

Balderston, C. Canby. *Managerial profit sharing; an examination of the technique of basing the extra compensation of executives and managers on profits.* Philadelphia: University of Pennsylvania Press, 1928. Apply.

Bryan, Leslie Aulls. *Industrial traffic management.* Chicago: A. W. Shaw Co., 1929. 404 p. $4.00.

Cameron, Jenks. *The Bureau of Dairy Industry; its history, activities, and organization.* Baltimore: Johns Hopkins Press, 1929. $1.50.

Hackett, James Dominick. *Labor management.* New York: D. Appleton & Co., 1929. 699 p. $5.00.

National Industrial Conference Board. *Industrial lunch rooms.* New York: Author, 1928. 74 p. Apply.

National Industrial Conference Board. *Industrial standardization.* New York: Author, 1928. 300 p. $3.50.

National Research Council. *Annual survey of American chemistry, 1927–28.* New York: Chemical Catalog Co., 1928. 395 p. $3.00.

Wilson, J. B. *Dictionary of accident insurance.* New York: Isaac Pitman & Sons, 1928. 814 p. $17.50.

MENTAL HEALTH

Anderson, V. V. *Psychiatry in industry.* New York: Harper & Bros., 1929. 379 p. $4.00.

Descoeudres, Alice. *The education of mentally defective children; psychological observations and practical suggestions.* New York: D. C. Heath & Co. $2.00.

Fishbein, Morris. *The human body and its care.* Chicago: American Library Association, 1929. 27 p. 50¢; pap. 35¢.

Gallichan, Walter M. *Youthful old age; how to keep young.* New York: Macmillan Co., 1929. 248 p. $2.50.

Jastrow, Joseph. *Keeping mentally fit.* New York: Greenberg, Publisher, Inc., 1928. 350 p. $3.50.

Löbel, Joseph. *Don't be afraid.* New York: G. P. Putnam's Sons, 1929. 239 p. $2.00.

McKendree, Charles A. *Neurological examination; an exposition of tests with interpretation of signs and symptoms.* Philadelphia: W. B. Saunders Co., 1928. 280 p. $3.25.

Riggs, Austen Fox, M.D. *Intelligent living.* Garden City, N. Y.: Doubleday, Doran & Co., 1929. 250 p. $2.00.

Rolleston, Sir Humphrey Davy. *Aspects of age, life, and disease.* New York: Macmillan Co., 1929. $4.00.

PSYCHOLOGY

Coghill, G. E. *Anatomy and the problem of behavior.* New York: Macmillan Co., 1929. 125 p. $3.00.

Köhler, Wolfgang. *Gestalt psychology.* New York: Horace Liveright, 1929. 413 p. $4.00.

Ladd-Franklin, Christine. *Colour and colour theories.* New York: Harcourt, Brace & Co., 1929.

Lazell, Edward William. *The anatomy of emotion; man's two natures.* New York: Century Co., 1929. 279 p. $3.00.

Root, William Thomas. *Psychology for life insurance underwriters.* Chicago: A. W. Shaw Co., 1929. 264 p. $3.00.

Sherman, Mandel and Sherman, Irene Case. *The process of human behavior.* New York: W. W. Norton, 1929. 227 p. $3.00.

Shimer, Hervey Woodburn. *Evolution and man.* Boston: Ginn & Co., 1929. 279 p. $2.60.

Watson, John B. and McDougall, William. *The battle of behaviorism; an exposition and an exposure.* New York: W. W. Norton, 1929. 96 p. $1.00.

TESTS

Chen, Hsuan Shan. *The comparative coachability of certain types of intelligence tests.* New York: Teachers College, Columbia University, 1928. 110 p. $1.50.

Cozans, Frederick Warren. *The measurement of general athletic ability in college men.* Eugene: University of Oregon Press, 1929. 67 p. $1.00.

Keys, Noel. *The improvement of measurement through cumulative testing; an empirical study of two hundred elementary school children over a period of four years.* New York: Teachers College, Columbia University, 1928. 89 p. $1.50.

Van Wagenen, Marvin James. *A teachers manual in the use of the educational scales.* Bloomington, Ill.: Public School Publishing Co., 1928 (rev. ed.). 282 p. $1.50.

Current Periodicals

Prepared by Linda H. Morley, *Industrial Relations Counselors, Inc.*

AGE

Clark, W. Irving. Fate of old employees. *Journal of Industrial Hygiene,* January 1929, Vol. 11, 1–5.

Reviews the effects of an effort to restrict the number of pensioners and, to a certain extent, to postpone the retirement of workmen who are now efficient.

Cowdrick, Edward S. Labor explores new fields. *Nation's Business,* March 1929, Vol. 17, 27–28, 191, 192, 194.

Placing the worn out worker. Transference of workers as they become older.

BONUS SYSTEM

Cary, C. R. (Vice-President in Charge of Sales, Leeds and Northrup Co.). Sales bonus plan of the Leeds and Northrup Co. *Personnel,* February 1929, Vol. 5, 276–280.

Team work among salesmen of a highly technical product.

Vernon, H. M. Effects of a bonus on the output of men engaged in heavy work. *Journal of the National Institute of Industrial Psychology,* January 1929, Vol. 4, 267–270.

Work in a tea factory.

BUDGETS

Achinstein, Asher. Can budget and cost-of-living studies be used as aids in determining a differential wage? *Journal of the American Statistical Society,* March 1929, Vol. 24, 28–39.

EDUCATION

Jacks, Lawrence Pearsall. Breadwinning and soulsaving. American *Journal of Adult Education,* February 1929, No. 1, 5–10.

FATIGUE

Mayo, Elton (Associate Professor of Industrial Research, Harvard Graduate School of Business Research). What is Monotony? *Human Factor,* January 1929, Vol. 5, 3–4.

Includes a bibliography on the subject.

HOURS OF LABOR

Alford, L. P. (Editor, *Manufacturing Industries*) and Hannum, J. E. How to evaluate the results of manufacturing operation. *Manufacturing Industries,* December 1928, Vol. 16, 589–594.

A new method in the operation of manufacturing establishments and an interpretation of the factors revealed by analyses of numerous records and statistics. K. M. H. explained.

Robbins, Lionel. Economic effects of variations of hours of labor. *Economic Journal,* March 1929, Vol. 39, 25–40.

IMMIGRATION

Davis, Horace B. Why labor leaves home; an international comparison. *Survey*, April 1, 1929, Vol. 62, 63–66.

INCENTIVES

Corley, F. W. (Vice-President and General Manager, Con. P. Curran Printing Co.). Wage incentives increase production. *Manufacturing Industries*, February 1929, Vol. 17, 99–102.

New plan works with unusual success under manufacturing program involving both machine and hand work.

Three hundred compensation plans for salesmen and how they work. *Sales Management and Advertisers' Weekly*, January 19, 1929, Vol. 17, 125–133. (Abstract in *Management Review*, March 1929, Vol. 18, 98.)

Summary of an investigation of the practices of 400 companies.

INDUSTRIAL RELATIONS

Donald, W. J., and Donald, Edith King. Trends in personnel administration. *Harvard Business Review*, January 1929, Vol. 7, 143–155. Also issued as reprint.

"This paper attempts to survey the outstanding new developments and to indicate trends which are likely to become most marked in the next few years."

Taussig, Frank W. Opposition of interest between employer and employees: difficulties and remedies. *Harvard Alumni Bulletin*, January 3, 10, 1929, Vol. 31, 390–397; 420–426.

LEISURE

Jacks, L. P. Ethics of leisure. *Hibbert Journal*, January 1929, Vol. 27, 270–281.

MACHINERY IN INDUSTRY

Chase, Stuart. Slaves of the machine. *Harpers' Magazine*, March 1929, Vol. 158, 480–489. (Abstract in *Management Review*, April 1929, Vol. 18, 124–125).

MEDICAL SERVICE

Odom, W. E. (Director, Department of Industrial Relations of the National Metal Trades Association). *Employee Medical Service*. Report of study made by its Committee on Industrial Relations and published by the National Metal Trades Association, Chicago, 1929.

MENTAL HYGIENE

Ray, Ermin L. (Director of the Conference Office, R. H. Macy & Co.). Study of candidates for promotion. *Human Factor*, January 1929, Vol. 5, 5.

Practice of psychiatric examinations in R. H. Macy and Company.

Smith, Elliott Dunlap (Professor of Industrial Engineering, Yale University). Mental hygiene and industrial management. *Human Factor*, January 1929, Vol. 5, 1–2.

Historical presentation of the theme.

NOISE

Laird, Donald A. Experiments on the physiological cost of noise. *Journal of the National Institute of Industrial Psychology*, January 1929, Vol. 4, 251–258.

Fatigue study.

PENSIONS

Latimer, Murray W. (Industrial Relations Counselors, Inc.). Old age pensions in America. *American Labor Legislation Review*, March 1929, Vol. 19, 55–66.

Report presented at the joint session of the American Association for Labor Legislation and the American Statistical Association, December 28, 1928.

PROSPERITY

Snyder, Carl. Problem of prosperity. *Journal of the American Statistical Association*, March 1929, Vol. 24, 1–14.

PSYCHOLOGY

Evidence on the value of psychology applied to vocational guidance. *Journal of the National Institute of Industrial Psychology*, January 1929, Vol. 4, 295–301.

Statistics showing use made of the service of the National Institute of Industrial Psychology in this respect.

Laird, Donald A. (Director, Psychological Laboratory, Colgate University).

Place psychology has won in business. *Printers' Ink Monthly*, January 1929, Vol. 18, 40, 122, 124. (Abstract in *Executives' Bulletin*, January 21, 1929, Vol. 4, p. 2).

Value of the psychological approach to business problems winning recognition in business.

RESEARCH

Alford, L. P. (Editor, *Manufacturing Industries*). Research the foundation of progress. *Manufacturing Industries*, February 1929, Vol. 17, 117–122.

Extensive programs adopted by a large number of successful industries are yielding huge returns on investments and big savings. The backward industry is the one doing no research.

RESEARCH—BIBLIOGRAPHY

Innis, H. A. Bibliography of research work. *Contribituions to Canadian Economics*, 1928, Vol. 1, 69–85.

Stine, Charles M. A. (Chemical Director, DuPont de Nemours & Co.). Debunking research. *Nation's Business*, February 1929, Vol. 17, 31, 215–216, 218.

SAFETY

Kossoris, Max. How effective are safety organizations? *Illinois Labor Bulletin*, March 1929, Vol. 8, 136–138.

Includes tables showing number of firms with and without safety organizations and annual accidents per one-hundred employees.

Status of industrial safety regulations. *Monthly Labor Review*, March 1929, Vol. 28, 521–533.

Results of a questionnaire, replies to which were received from all but two states.

SCIENTIFIC MANAGEMENT

Urwick, L. Significance of rationalization: an alternative view. *Harvard Business Review*, January 1929, Vol. 7, 170–174.

Answer to an article by Oliver Sheldon in the April issue of the same Review.

SELECTION OF EMPLOYEES

Cook, Henry W. Selection of employees. *Life Office Management Association Proceedings*, 1928, 145–146. (Abstract in *Management Review*, March 1929, Vol. 18, 88).

Northwestern National Life Insurance Company methods of selecting employees from graduates of the schools.

Laird, Donald A. (Director, Psychological Laboratory, Colgate University). This bunkum about hard work. *Printers' Ink*, April 18, 1929, Vol. 147, 33–34.

True work is self-expression—not hard labor.

SKILL

Effect of mass production upon skill in an English factory. *Monthly Labor Review*, March 1929, Vol. 28, 473–476.

Abstract of an article by C. G. Renold of the English firm of Hans Renold, Ltd.

SOLICITING SUGGESTIONS FROM EMPLOYEES

Mavor, Sam. Suggestion schemes as a means of promoting co-operation of the worker in industry. *Journal of the National Institute of Industrial Psychology*. April 1929, Vol. 4, 340–347.

STABILIZATION OF EMPLOYMENT

Steady production and steady jobs. *Survey*, April 1, 1929, Vol. 62, 41–48.

A series of articles each describing stabilization methods of a corporation, each in a different industry, as follows: "Dates," Ernest G. Draper; "Shoes," George F. Johnson; Canning," W. P. Hapgood; "Paper," Henry S. Dennison; "Soap," William Cooper Procter; "Floor Wax," H. F. Johnson; "Hats," Fletcher H. Montgomery.

STANDARDS OF LIVING

Hoffer, C. R. Research in the standard of living, *Social Forces*, March 1929, Vol. 7, 399–402.

STATISTICS—OCCUPATIONS

Mann, Lawrence B. Occupational shifts since 1920. *Journal of the American*

Statistical Association, Supplement, March 1929, Vol. 24, 42–47.

Gives a table of estimated shifts.

STATISTICS—THEORY AND PRACTICE

CARROLL, MOLLIE RAY. Recent improvements in German social statistics. *Journal of the American Statistical Association*, December 1928, Vol. 23, 386–397.

GIVENS, MEREDITH B. Measurability of unemployment and related trends. *Journal of the American Statistical Association, Supplement*, March 1929, Vol. 24, 33–41.

Methods used in developing the unemployment estimates in the Unemployment Section of the Recent Economic Changes study of the National Bureau of Economic Research.

TESTS

JONES, Ll. WYNN. Individual differences in mental inertia. *Journal of the National Institute of Industrial Psychology*, January 1929, Vol. 4, 282–294.

Tests for measuring this factor in industrial workers described.

KORNHAUSER, ARTHUR W. Results from the use of objective tests and questionnaires in a college course on the Economic Order. *Journal of Business of the University of Chicago*, Jan. 1929, Vol. 2, 82–111.

Psychological tests in an electric lamp works. *Journal of the National Institute of Industrial Psychology*, January 1929, Vol. 4, 259–260.

Statistics and experience of Philip's Electric Lamp Works (Eindhoven, Holland.)

TRAINING

CLARKE, H. J. (Director, Selfridge & Co., Ltd., London). How we fit the man to his job. *Nation's Business*, April 1929, Vol. 17, 106, 109–110.

Training in a retail store in Great Britain.

DIEMER, HUGO (Director of Management Courses, LaSalle Extension University). "Foreman training by the correspondence method." *Society of Industrial Engineers Bulletin*, February 1929, Vol. 11, 11–14, 17.

GRANT (W. T.) COMPANY. School for managers planned by chain group. *Advertising and Selling*, December 12, 1928. Vol. 12, 70. (Abstract in *Management Review*, February 1929, Vol. 18, 62–63.

POLAKOV, WALTER N. Training executives in the habit and thought of industry. *Society of Industrial Engineers Bulletin*, February 1929, Vol. 11, 15–17.

UNEMPLOYMENT

LEISERSON, WILLIAM M. (Professor of Economics, Antioch College). Unemployment, 1929. *Survey*, April 1, 1929, Vol. 62, 9–10, 77–78.

Unemployment as the direct outcome of prosperity: retail stores, factory production, wages at high levels, with an increasing spread between these signs of good times and the number of workers who are at work.

LEWISOHN, SAM A. Unemployment—the price of progress or the sign of decay. *American Labor Legislation Review*, March 1929, Vol. 19, 81–87.

Address delivered at Chicago on December 27, 1928 as president of the American Association for Labor Legislation at its joint session with the American Sociological Society and the National Community Center Association.

LUBIN, ISADOR (Institute of Economics, Brookings Institution). "Let out." *Survey*, April 1, 1929, Vol. 62, 11–13.

At the suggestion of the Senate Committee on Labor and Education the Institute of Economics of Brookings Institution has been making a broad study of industrial unemployment. This article is based on one section of the study—a survey of 754 workers "let out" during the twelve months preceding September, 1928.

LUBIN, ISADOR. Measuring the labor absorbing power of American industry. *Journal of the American Statistical Association, Supplement*, March 1929, Vol 24, 27–32. Reprint.

UNEMPLOYMENT—SURVEYS

CROXTON, FREDERICK E. Experiment in the measurement of unemployment. *Journal of the American Statistical Association, Supplement,* March 1929, Vol. 24, 58–64.

Study of unemployment in Columbus, Ohio.

UNEMPLOYMENT INSURANCE

CARROLL, MOLLIE RAY (Goucher College). Germany's new unemployment insurance. *American Labor Legislation Review,* March 1929, Vol. 19, 97–105.

National Compulsory Unemployment Insurance scheme.

UNITED STATES—POST OFFICE DEPARTMENT

BOWERS, GLENN A. (Director of Research, Industrial Relations Counselors, Inc.) Post office service relations division; a valuable but little known government activity. *Personnel.* May 1929, Vol. 6, 3–10.

WAGES

CARVER, T. N. Economy of high wages. *American Bankers Association Journal,* April 1929, Vol. 21, 963–964.

WAGES—PAYMENT METHODS

LINDSAY, J. C. Fixing drivers' pay by the work they do. *Bus Transportation,* April 1929, Vol. 8, 203–205.

LUNDY, ROBERT R. (Supervisor of Layout, Studebaker Corporation of America). Weekly group piece work system. *Personnel.* February 1929, Vol. 5, 268–274.

Method of wage payment used by the Studebaker Corporation.

WOMEN IN INDUSTRY

AYUSASA, IWAO F. Employment of women in Japanese industry. *International Labour Review,* February–March, 1929, Vol. 19, 193–204; 385–401.

Statistical survey: Hours of work, overtime, night work, rest periods, holidays, wages, and legislation described. To be continued.

The Human Factor in Substation Operation

Specifications and Tests for Substation Operators*

By Morris S. Viteles, *University of Pennsylvania*

Mistakes in hiring are sometimes costly in more ways than one; as when selection of the wrong applicant leads to destruction of valuable equipment, interference with public service, and consequent loss of good will. So, wherever there are power stations the electrical industry will be interested in this report of Dr. Viteles' latest research. He has ascertained the pattern of abilities required in a substation operator; and then developed, standardized and proved the worth of certain tests suitable for predicting ability to learn this work.

This paper reports a battery of tests adapted and devised for the selection of electrical substation operators. The chief duties of these operators after careful job analysis and the plotting of a job psychograph were defined as (1) the manipulation of numerous and extremely complicated apparatus for transforming and regulating voltage, etc.; (2) the reading of meters; and (3) care of the station and its equipment. In determining methods of testing aptitudes for this job, the duties under (3) were distinguished from those under (1) and (2); and normal conditions of operation were sharply distinguished from emergency conditions. Seven specific essential abilities were isolated after careful analysis; and, after experimentation ten tests given in three series were adopted for selective purposes: Series A, five tests of paper and pencil type; Series B, four performance tests; Series C, switching control test to measure ability to operate under emergency conditions. A validation of the latter series is not complete. The paper confines itself to the results of Series A and B. Eighty-four operators were tested and scored, and for statistical purposes were divided into three groups, Best, Average, and Poorest. Test scores were compared with the number of operating errors (the latter was disclosed to be in itself a criterion for classification), and statistical reliability computed. The tests are presented as having justified their use for the selection of assistant operators to be trained in substation operation.

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*The work described in this paper was done by the author serving in the capacity of Consulting Psychologist for the Philadelphia Electric Company. In presenting the paper the writer desires to make his acknowledgments to members of the Operating Department and of the Personnel Department without whose helpful coöperation this work could not have been done.

ECONOMY in the distribution of electric current involves generation and transmission at high voltages which are reduced at electrical substations prior to the delivery of current to the consumer. The substation is supplied with a number of lines through which is received current from generating stations and a greater number of circuits through which current at a lower voltage is transferred directly to individual consumers or to equipment through which a number of consumers are served. Associated with the lines and the circuits are a great variety of equipment for transforming and regulating voltages, a great number of recording meters, relaying and other protective devices, rotative equipment, etc. The operation of this equipment involves the manipulation of numerous switches. The manipulation of these switches, the reading of meters and the care of the station and its equipment in such a manner as to provide regular and uninterrupted service to the consumer are, in brief, the chief duties of the electrical substation operator.

The physical conditions under which he works and the character of the equipment which the substation operator handles in providing regular and uninterrupted service can be seen from the accompanying picture of a portion of a typical electrical substation. (Fig. 1.) A more detailed statement of his duties are embodied in this extract from the job specification used by the employment office of The Philadelphia Electric Company:

"Direct duties

"Under the direction of a Substation Foreman, an Assistant Substation Foreman or a Senior Substation Operator in the Substation Operating Branch of the Station Engineering Division, and in accordance with instructions received from the Load Dispatcher, attends to the operation of the equipment in a substation during a shift, and directs Assistant Operators and Helpers in connection with any part of the work, as follows:

"1. Continuously watches pilot lights, instruments and meters, ground lamps, oil switch controls, drop signals, all rotating and stationary apparatus under load, and all auxiliary apparatus.

"2. Operates switches on lines, circuits and feeders for the proper distribution of load.

"3. Starts, operates and shuts down individual machines, transformers, etc., blocks apparatus and grounds it for safety when worked upon.

"4. Directs and inspects, or performs, cleaning operations on substation equipment and in the building, according to routine.

"5. Carries out routine testing operations on apparatus, lines, circuits and feeders.

"6. Carries out routine and special instructions for recovering from power interruptions.

"7. Directs and makes minor repairs on substation equipment.

"8. Is responsible for the taking and recording of meter readings.

"Technical Knowledge and Experience Required

"1. Knowledge of the principles of electricity and of the construction and detailed operation of substation equipment.

"2. Knowledge of the means of protection of apparatus against overload, etc.

"3. Knowledge of the location and functions of all apparatus in the substation.

"4. Plant experience as Assistant Substation Operator.

"5. Knowledge of the Station Operating Handbook."

The importance of maintaining uninterrupted service is almost self evident. A brief reference to the pos-

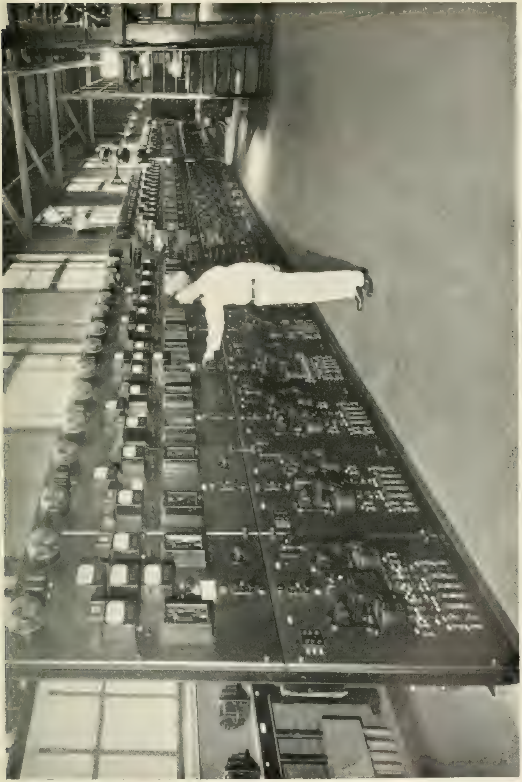

FIG. 1. SECTION OF A TYPICAL ELECTRICAL SUBSTATION

sible effects of an interruption following upon the inaccurate operation of switches may serve to demonstrate more clearly to the casual reader the significance of such methods of selection and training through which the number of operating errors may be reduced. If the interrupted circuit is feeding a hospital there may be serious consequences following upon the unexpected failure of lights or power equipment, particularly if an operation is being performed at the time. There are industrial operations in which even a momentary interruption may cause serious damage to material in the process of manufacture. So, for example, in the manufacture of rayon the failure of the supply of power to machines causes a break in the manufacturing process involving considerable loss to the manufacturing concern. The entire load of a grain elevator may be dumped upon the operating motor if the current is interrupted for even a fraction of a minute. In addition to such inconveniences and losses, and possible damage to very expensive equipment in the substation itself, there may be more serious consequences of an operating error in the form of injury to the operator or of actual loss of life. This is especially apt to be the case when the man undertakes to handle as "dead," equipment which is actually alive. Mechanical and electrical safeguards against such occurrences are provided, but these cannot completely take the place of human control exercised by an operator, physically and mentally competent, and prepared by suitable training to handle the job.

In avoiding such switching errors the operator is faced with certain conditions inherent in the nature of the job.

a. The apparatus which he handles is extremely complicated in character. A single switching operation may involve as many as twenty or more moves, each of which must be performed in the proper sequence.

b. The employe acts in the double capacity of janitor and operator, and he may be called upon to make a sudden transition from the job of cleaning, involving little display of mental ability, to a switching or blocking operation involving a considerable amount of technical knowledge and training and the display of a high degree of alertness and judgment in avoiding error. In few occupations is the worker required to exhibit so high a degree of adaptability. This is especially the case when a disturbance on the system, an electrical storm, or trouble in the substation equipment gives rise to flashovers, to the searing, driving, rasping, noises of high tension electric sparks, to smoke, etc. The latter conditions occur infrequently, but the satisfactory operator must be as capable of switching accurately, with judgment, and even swiftly, under these circumstances as under more normal operating conditions.

c. As an additional complicating fact, the substation operator is often called upon to play a lone hand. Most of the stations are one-man stations in which there is no more than a single operator without a helper on duty at any one time. Although orders for switching are given to him by a Load Dispatcher located at a central point, and fully familiar with the substation, there is no one present to check the operator's moves, to correct and prevent errors by recognizing as incorrect a proposed move before it is actually made.

Inaccuracy in operation can in part be avoided through suitable training. In recognition of this, prospective operators are hired as assistant operators and given technical training in substation operating practices and in electrical theory. Each employe is required to spend a year as an assistant operator before he is promoted to the rank of operator and entrusted with the operation of the substation. However, in spite of similarities of training, certain operators have been found to be more reliable, that is, less susceptible to errors than others. This suggested to the Superintendent of Substations of the company considered in this report that there may exist a predisposition toward error which could be determined prior to employment,—that it might be possible to set up specifications and to devise tests to determine before employment whether an applicant would prove thoroughly reliable as an operator. In accordance with this thought, in March, 1927, the writer undertook to analyze the occupation of substation operator and to prepare tests for the selection of competent operators. The investigation was originally oriented as a problem in selection, but there have been valuable by-products, in the systemization of training, the development of follow-up methods, etc., a brief report upon which will be embodied in this paper.

It seems interesting, both as a description of the purpose of the original program and as an indication of the conditions under which this study has been carried through, to quote from the letter describing the proposed investigation sent by the Superintendent of Substations to substation operators and other employes who have been called upon to coöperate in it:

> "Apparatus for the job is selected with more and more care," writes the Superintendent of Substations, "why not apply more and more care to the selection of human beings for a particular job? We plan to develop a program looking to this end. There are switchboard operators who are more reliable than others. We hope to make a study of the qualities or characteristics of both groups. From the results obtained it is hoped to fashion a yardstick with which to measure applicants. An interesting point is that while all applicants will be measured, that is, tested, the results will not at first enter into the selection of men. As time goes on, performance records will be compared with the entrance test with the object of proving the value of the test. Then, when and if the worthiness of the tests is confirmed, they can be definitely adopted for entrance requirements. Let me repeat that the design, construction, and installation of equipment have been highly developed to a point where it might be fairly said that materials are more reliable than men. The opportunity is present for improving the human factor with a view of increasing the reliability of the product we sell to our customers, and we are proceeding to develop this idea by undertaking a study of switchboard job requirements, a study of operators and a study of future applicants for this work. I am sure that this investigation will engage the interest and attention of the entire Operating Department."

ANALYSIS OF SUBSTATION OPERATION AND QUALIFICATIONS OF THE SUBSTATION OPERATOR

The first step in this investigation took the form of determining the abilities necessary for successful accomplishment in the work of substation operation. Several methods were used in studying the mental requirements of the job. In the first place, an assistant was placed in the substations for a period of approximately three months, performing the work of an assistant substation operator and receiving intensive training in substation operation. At the end of that time, as the result of this very intensive instruction, he was actually able to pass the operator's examination given to assistants, usually at the end of a year, as a preliminary to promotion to the rank of operator. Secondly, the writer spent considerable time, over a period of four months, in visiting various types of substations and in closely observing and analyzing the work of substation operators. In addition, supervisors and others were asked to prepare "job psychographs" or descriptions of the various requirements of the job in accordance with the procedure which the writer has described elsewhere.[1]

A survey of the data obtained in this way led to the conclusion that, for the purpose of testing aptitude for substation operation, it was necessary to distinguish between two distinct aspects of the job of substation operation.

The first aspect is concerned with the housekeeping or cleaning duties for which the operator is responsible. Although of great importance from the viewpoint of working efficiency, it seemed unlikely that aptitude for these duties could be determined in advance. It also seems probable that efficiency in housekeeping is more closely allied to training and administration than to individual differences subject to measurement prior to employment.

The second aspect of the job is associated with the performance of necessary switching operations, and involves a capacity to perform such operations accurately and expeditiously. In this connection, for the preparation of suitable employment tests it seemed necessary to distinguish between two sets of conditions under which such switching operations are carried through. The first may be briefly described as normal conditions; the second as conditions of extreme emergency.

Emergency conditions are distinguished from normal operating conditions by the presence of such extremely disturbing factors as smoke, fire, electric flash-overs, etc., not present in the ordinary course of substation operation. Under normal operating conditions the operator may be called upon to deal quickly and accurately with unexpected occurrences, such as the loss of "load" in a line or circuit, or trouble with equipment, etc., but he is not required to face, in addition, the frightening and dangerous phenomena which appear in what has been designated as emergency conditions. These phenomena are such that they may lead and have led operators particularly susceptible to such disturbances to telephone to the central office, from some point away from the smoke filled station, an immediate resignation. However, the infrequency of such occurrences, the special conditions, the differences in the traits involved in maintaining efficient operation under such conditions made it seem desirable, in the analysis of the job and in the preparation of selection tests, to distinguish aptitude for operation under normal conditions from that for operation under emergency conditions.

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[1] Morris S. Viteles, Job Analysis and Tests of Job Competency for the Auditing Division of a Street Railway Company, *Psychological Clinic*, Vol. XIV, 3–4, 1922.

The analysis of the duties and mental requirements of substation operators under normal conditions showed that the following abilities are necessary for satisfactory operation. It is these abilities which largely determine the individual's proneness to error in switching under normal conditions and which must be measured in selecting operators least liable to such errors.

a. Ability to learn and to recall in proper order the complex series of switching operations with which the operator must be familiar.

b. Accuracy in following directions and in employing knowledge of substation operation in switching and blocking.

c. Ability to comprehend readily instructions given either verbally or in writing.

d. Persistence in keeping at a problem until it has been solved, or until the operator has satisfactory reason for believing that the problem cannot be solved by methods at his disposal.

e. Judgment and analysis in solving a new problem, e.g., in locating and remedying trouble.

f. Ability to give coördinated attention to a number of different operations or things at the same time; to spread attention over the details of a blue print; over the correct switching handle, ammeters, etc.

g. Ability to carry in mind the location of equipment in substations and an image of wiring arrangements, etc.

Other abilities and temperamental traits play a part, but do not appear to determine to the same extent as those described above predisposition to error under normal operating conditions. The extent to which other abilities play a part is indicated in the Job Psychograph or description of job requirements presented in figure 2.[2]

In the case of emergency conditions the outstanding qualities making it possible to continue safe and accurate operation seem to be temperamental in character. They are primarily associated with individual differences in temperament as contrasted with mental ability. For accurate operation in emergency conditions the operator must be capable of resisting fear and its devastating effects. In substation operation the effect of fear is generally displayed in an immediate loss of accuracy; in increase of the time taken to clear up trouble, and in a general loss of certainty and reliability which may extend over a considerable period of time following the appearance of the disturbing stimulus. Such a change may occur even in the case of operators who have demonstrated their ability to operate satisfactorily under normal conditions. It therefore seemed necessary, in the development of tests for the selection of substation operators, to provide distinct instruments for the measurement of fear resistance and the associated temperamental traits which play a dominant rôle in determining response under emergency conditions.

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[2] For procedure used in preparing this job psychograph see article referred to in footnote 1.

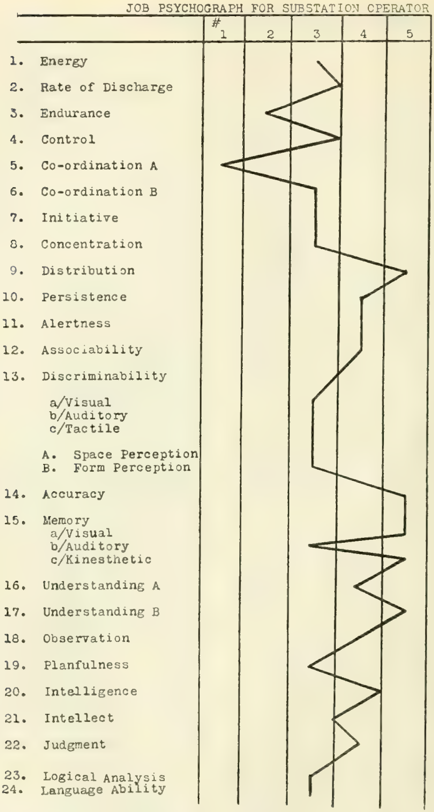

FIG. 2. JOB PSYCHOGRAPH FOR SUBSTATION OPERATOR

(#1, negligible; 2, barely significant; 3, significant; 4, of great importance; 5, of utmost importance.)

THE MAKE-UP OF THE TEST SERIES

Subsequent to the analysis of the work of the substation operator tests were prepared to measure the mental abilities and temperamental traits necessary for safe and accurate substation operation under all conditions. Numerous tests were tried out in the early phases of this investigation, but this paper concerns itself with only those tests which were finally selected for use as valid instruments in the selection of competent operators. These are ten in number and are divided into three series.

Series A includes the following five tests of the paper and pencil type:[3]

1. Pursuit Test.
2. Blocks B.
3. Blocks A.
4. Location Test.
5. Series Completion Test.

Series B consists of the following four performance tests:

1. Puzzle Box.
2. Directions Test.
3. Learning Test.
4. Persistence Test

Photographs of these tests are included in this report. (Figs. 3 and 4.)

The tests in Series A and Series B are used to measure predisposition to work satisfactorily under normal operating conditions. Tables have been prepared which make it possible to transmute the scores on the individual tests so that each is given equal weight in a Total Test Score embodying performance on all of the tests in Series A and B. Reference will be made to this Total Test Score in describing the validation of these tests.

Series C includes one test, known as the Switching Control Test, designed by the author in coöperation with various members of the organization for the purpose of measuring the capacity to maintain safe and accurate operation under emergency conditions.[4]

COMPARISON OF TEST SCORES WITH OPERATING EFFICIENCY

The tests in Series A and B have been adequately standardized and

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[3] Tests 1, 2 and 4 in Series A are adaptations of tests of the same name embodied in the McQuarrie Tests of Mechanical Aptitude. Tests 3 and 5 are adapted from Army Beta.

Series B, Test 1 (Puzzle Box) is a test designed by Healy and commonly known as the Healy Puzzle Box, used here with a different procedure than that ordinarily employed. (See R. Pintner and D. G. Paterson, *A Scale of Performance Tests*.)

Series B, Test 2 (Directions Test) is a test designed by the writer for the purpose of measuring individual differences in the ability to comprehend readily and to follow accurately instructions given either verbally or in writing. It involves a series of 24 orders for the manipulation of the switch panels and boxes which make up the test.

Series B, Test 3 (Learning Test) is an adaptation, both in design and administrative procedure of a choice reaction apparatus used hitherto in laboratory experiments, but employed for the first time, in so far as the writer is aware, in an industrial investigation. It is used as a test of the ability to learn and recall in proper order the complex series of switching operations with which the substation operator must be familiar.

Series B, Test 4 (Persistence Test) was designed by J. J. B. Morgan and H. L. Hull (See J. J. B. Morgan and H. L. Hull, The Measurement of Persistence, *Jour. App. Psy.*, 1926, 10, 180–187).

[4] The average time taken for the examination on Series A and Series B is approximately two and a half hours. Another half hour is required for Series C. (Switching Control Test.)

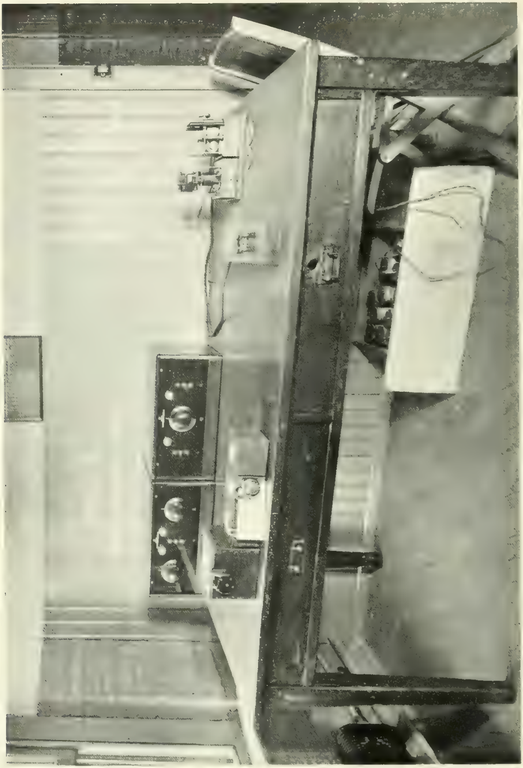

FIG. 3. TESTING APPARATUS FOR SELECTION OF SUBSTATION OPERATORS. DIRECTIONS AND LEARNING TESTS

evaluated and are at present being used in hiring assistants to be trained in substation operation.[5]

As a preliminary to their adoption as employment instruments, the validity of the tests as measures of predisposition to error was examined by a comparison of test scores with the operating records of a group of substation operators. This group consisted of 84 operators, each one of whom had been working as an operator for not less than one year and not more than ten years.

As the first step in this comparison of test scores and operating efficiency these operators were divided into three groups designated as Best, Average, and Poorest, respectively. A group of thirteen men, including seven load dispatchers and six members of the supervisory force of the Substation Section, all of whom were in close contact with the operators, were asked to coöperate in classifying them. Each of these men was given a sheet listing the names of the operators included in the experimental group, and asked to place a B before the name of each operator whom he considered to be one of the best operators, and a P before the name of each operator whom he considered to be one of the poorest operators in the employ of the Substation Section. Each substation operator was then allowed a credit of +1 for each time that he was selected for the Best group, and a credit of −1 each time that he was selected for the Poorest group.

When scored in this way, certain operators were selected for the Best group as many as 12 times, receiving a total credit of +12 and other operators were selected for the Poorest group as many as 12 times, receiving a total credit of −12. When rating scores were computed for all operators by finding the algebraic sum of + and − credits, 17 operators were found to have received a score of +5 or more, and 13 operators a score of −5 or less. The former were selected as members of a group of representative Best operators and the latter as a group of representative Poorest operators. The remaining 54 operators, obtaining scores ranging in value from +4 to −4 were designated as a group of Average operators.[6] It is significant to note that all three groups are practically identical with respect to the distribution of age and of length of service and with respect to the average age and length of service of the members of the group. This indicates that actual efficiency and not length of service was weighted by those responsible for the classification, in the selection of Best, Average, and Poorest operators.

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[5] The validation of Series C (Switching Control Test) has not yet been completed and no report of such validation will be included in this paper. The test is here described as a matter of interest in connection with the development of the program for testing substation operators. However, it may be in place to state that the preliminary evidence so far obtained favors the validity of the test as a measure of proneness to unreliability in an emergency.

[6] When the investigation was started, in March, 1927, there were actually 98 men in the experimental group divided into 20 Best, 60 Average, and 18 Poorest operators. The experimental group included all with the exception of 10 operators employed in the Substation Section. On September 30, 1928, the date of the last comparison included in this report, the group had been reduced by promotions, transfers, separations, etc., to the 84 operators with whom this section of the report is concerned.

As a preliminary step in the validation of the tests in Series A and Series B, a comparison was made of the test scores of the Best, Average, and Poorest operators. The results of this comparison are embodied in the tables

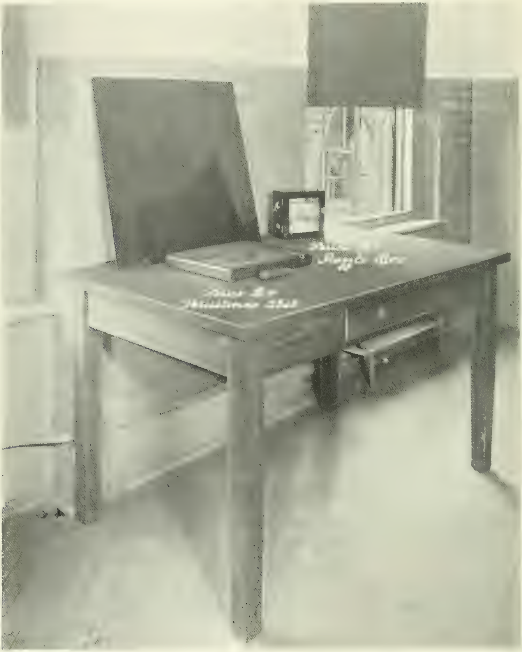

FIG. 4. TESTING APPARATUS. PUZZLE BOX AND PERSISTENCE TEST

and figures presented below. However, it was felt that such subjective ratings might be altogether unreliable in differentiating among the operators with reference to their actual efficiency in substation operation. It was therefore decided to make use, in addition, of available records on switching errors in setting up a more definite criterion of operating efficiency. It was found that an accurate record of operating errors had been maintained

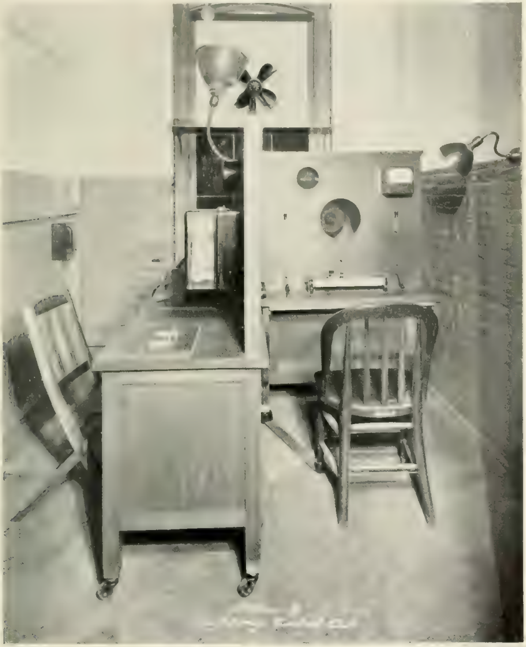

FIG. 5. TESTING APPARATUS. SWITCHING CONTROL TEST

in the company files beginning with January 1, 1926.[7]

In June, 1927, a preliminary comparison of operating errors of men in the Best, Average, and Poorest groups was prepared. The results of this analysis are shown in table 1. The table shows a definite tendency on the part of the Best operators to make fewer errors than Average operators and for Poorest operators to be responsible for a greater proportion of errors than the Average and Best operators. It was felt that these figures tended to confirm the ratings made by supervisors and load dispatchers as valid estimates of the operating ability of men employed in the substations. The validity of the ratings have been further examined by periodic comparisons of increase in the operating errors of Best, Average, and Poorest operators, subsequent to the date of the first comparison. There has been found a consistent tendency for a marked increase in the number responsible for operating errors in the case of men classified as Poorest and Average and for only a negligible increase in the case of those classified as Best. The increase in number of Average operators responsible for errors is proportionately less than that of Poorest operators. In addition, the difference among the three groups with respect to percentage responsible for errors remains quite constant. These facts are readily observable in table 1 embodying a comparison of operating errors of men in this group at the end of June 30, 1927 and September 30, 1928, including a record of errors over periods of one year, six months, and two years, nine months, respectively.

Table 1 shows not only the greater increase in errors on the part of the two groups referred to above, but also shows that on September 30, 1928, Poorest operators were actually responsible for 8 times as many errors per man as Best operators and 3 times as many errors per man as Average operators. Average operators, on the other hand, are shown to be responsible for three times as many errors per man as are operators in the Best group.

In view of this demonstration of the validity of ratings made by supervisors and load dispatchers in indicating the efficiency of substation operators, it was decided to use these ratings as well as actual records of operating errors in determining the validity of the tests as measures of competency in substation operation. It is to be noted, however, that these ratings are used as a distinct criterion and that, in addition, a detailed comparison between test scores and the purely objective criterion of operating

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[7] Reports of operating errors are prepared monthly by the Load Dispatcher's office and are filed in the office of the Substation Section. Errors include inaccurate operations actually resulting in the loss of load or potentially capable of bringing about such a loss. Assignment of responsibility to individual operators is made by the Superintendent of Substations. All operating errors are discussed at the periodic meetings of the division heads of the Operating Department. At this time, exception to the Load Dispatcher's designation of a particular situation as an error may be taken. In certain, although infrequent instances, such an exception may be allowed and the error removed from the record.

TABLE 1

Operating errors of substation operators.

OPERATORS*	NUMBER OF MEN IN GROUP		PER CENT INVOLVED IN ERROR		NUMBER OF ERRORS		PER CENT OF TOTAL ERRORS		AVERAGE ERROR PER MAN IN GROUP	
	June, 1927	September, 1928	June, 1927	September, 1928	June, 1927	September, 1928	June, 1927	September, 1928	June, 1927	September, 1928
Best	19	17	10.6	23.5	2	4	6.5	6.3	0.11	0.24
Average	58	54	27.5	51.9	18	37	58.0	57.8	0.31	0.69
Poorest	18	13	38.7	76.9	11	23	35.5	35.9	0.61	1.77

* Best rated scores of +5 and above; Average, between −4 and +4; Poorest, −5 and below.

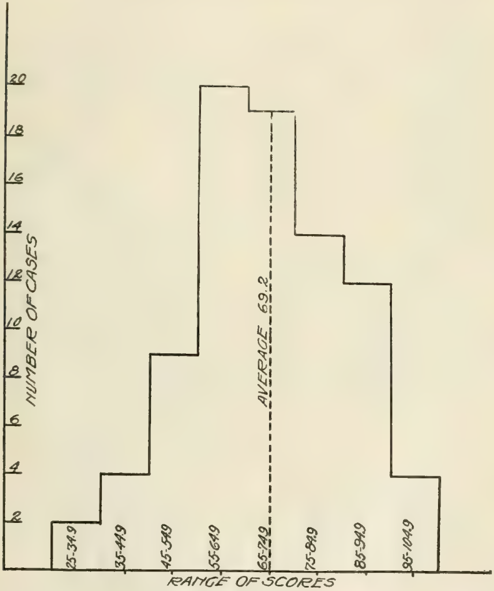

FIG. 6. DISTRIBUTION OF TOTAL TEST SCORES OF 84 SUBSTATION OPERATORS

errors has been prepared. Furthermore it is felt that this comparison of operating errors in two successive periods of time furnishes evidence to the effect that the objective criterion, —the number of operating errors,— is itself a reliable one.

In figure 6 is shown the distribution of the Total Test Scores (Series A and B) of the eighty-four operators in the experimental group.

TEST SCORES OF BEST, AVERAGE AND POOREST OPERATORS

In table 2 is shown a comparison of average test scores and operating errors of Best, Average, and Poorest operators. The most significant features of this table are reproduced in graphic form in figure 7.

The average Total Test Score of the Poorest group is shown to be 27.9 points below that of the Best group and 15.7 points below that of the Average group.

Whenever two or more groups are compared in this way, it is necessary to determine whether the difference between any two of the groups is completely reliable. The statistical significance of the difference in the average Total Test Scores of the Best, Average, and Poorest operators have been investigated and have been found in every instance to be completely reliable.[8]

In figure 8 is presented a comparison of substation operators making Total Test Scores of 75 and above with those making scores of below 75. At the present time only applicants for employment who make a score of 75 or more are recommended for employment. This score was arrived at following a very thorough analysis of test scores, a detailed description of which need not be included here.[9]

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[8] An index known as $\frac{\text{Diff}}{S.D.\text{Diff}}$ tells just how significant a difference is. For example, if $\frac{\text{Diff}}{S.D.\text{Diff}}$ equals 2, the chances are 43 in 44 that the observed difference is real and in the direction indicated. When $\frac{\text{Diff}}{S.D.\text{Diff}}$ equals 3, the chances are 740 in 741. If $\frac{\text{Diff}}{S.D.\text{Diff}}$ is 5, the chances are approximately 3,500,000 to 1 that the difference is real and in the direction indicated. (See W. V. Bingham and M. Freyd, *Procedures in Employment Psychology*, pp. 171, ff).

The significance of this measure may be further indicated in the fact that with a $\frac{\text{Diff}}{S.D.\text{Diff}}$ of 2, the chances of the obtained difference being a true difference greater than zero are 98.01. With a $\frac{\text{Diff}}{S.D.\text{Diff}}$ of 3, the chances of the observed difference being a true difference greater than zero are 99.9. (See H. E. Garrett, *Statistics in Psychology and Education*, pp. 128 ff.)

"Whenever two or more groups are compared the $\frac{\text{Diff}}{S.D.\text{Diff}}$ must be computed to determine the significance of the findings. The $\frac{\text{Diff}}{S.D.\text{Diff}}$ must be at least 2 to be significant. It should probably be close to 3 to afford a safe basis for selecting employes." (Quoted from D. A. Laird, *Psychology of Selecting Men.*)

The findings concerning the significance of the difference in average Total Test Score among Best, Average, and Poorest operators are presented in table 3.

[9] This Total Test Score of 75 is above the average for operators in the Average group. It was found that 35.7 per cent of the eighty-four operators in the experimental group, tested after employment, reached the passing score. Of applicants tested prior to employment since March 1, 1928, approximately 40 per cent have been recommended for employment and 60 per cent rejected for failure to make the Total Test Score of 75.

TABLE 2

Average test scores and operating errors of 84 substation operators

(January 1, 1926, to September 30, 1928)

OPERATORS*	NUMBER OF MEN IN GROUP	NUMBER INVOLVED IN ERRORS	PER CENT INVOLVED IN ERRORS	NUMBER OF ERRORS	PER CENT OF TOTAL ERRORS	AVERAGE ERROR PER MAN IN GROUP	AVERAGE TEST SCORE	*S.D.* OF AVERAGE TEST SCORE
Best	17	4	23.5	4	6.3	0.24	81.4	13.6
Average	54	28	51.9	37	57.8	0.69	69.2	13.5
Poorest	13	10	76.9	23	35.9	1.77	53.5	15.6
Total	84							

* Best rated scores +5 and above; Average, −4 to +4; Poorest, −5 and below.

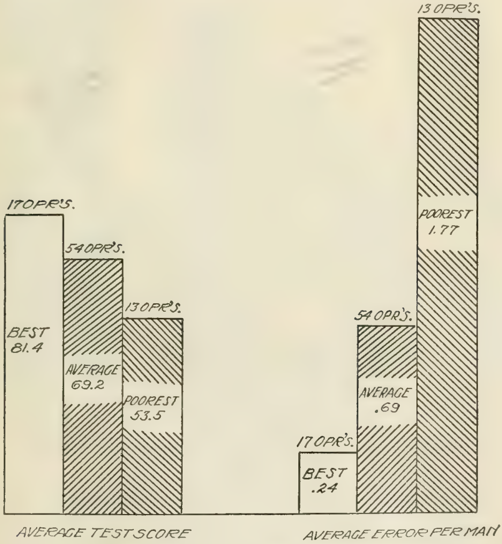

FIG. 7. AVERAGE TOTAL TEST SCORES AND AVERAGE ERROR PER MAN OF 84 SUBSTATION OPERATORS

The percentage of Best operators with the passing score of 75 is double that of average operators and about 10 times that of Poorest operators.

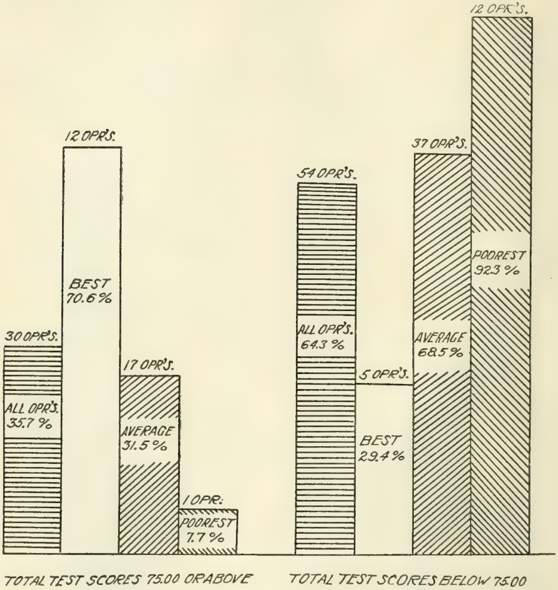

FIG. 8. ANALYSIS OF 84 OPERATORS WITH SCORES ABOVE AND BELOW CRITICAL TOTAL TEST SCORE OF 75

It is interesting to note that only 7.7 per cent of the Poorest operators would have been hired had they been tested prior to employment, whereas 70.6 per cent of the Best operators would have been employed. This is of particular significance when it is recalled that the men in the Poorest group average 8 times as many errors as those in the Best group and that this small group of 13 Poorest operators has to date been responsible for 23 or 35.9 per cent of the errors made by all the operators hired during the

TABLE 3

The reliability of differences in average total test scores of 84 substation operators

GROUPS COMPARED	DIFF. IN AVERAGE TOTAL TEST SCORE	$\frac{\text{Diff.}}{S.D.\ \text{Diff.}}$
Best and Average	12.2	14.5
Best and Poorest	27.9	19.4
Average and Poorest	15.7	12.9

TABLE 4

The reliability of differences in average total test scores of operators with and without errors

NUMBER OF ERRORS	DIFF. IN AVERAGE TOTAL TEST SCORE	$\frac{\text{Diff.}}{S.D.\ \text{Diff.}}$
0–1	2.7	5.0
0–2 or more	11.1	10.9
1–2 or more	8.4	8.1

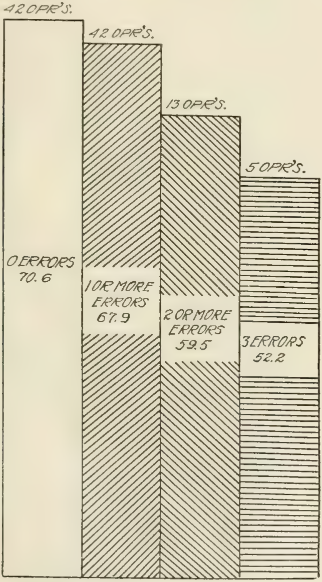

FIG. 9. AVERAGE TOTAL TEST SCORES OF 84 OPERATORS WITH 0, 1, 2, AND 3 ERRORS

last 10 years and still in service. On the other hand, the 17 Best operators have been responsible for only 6.3 per cent of the total number of errors.

TEST SCORES OF OPERATORS WITH AND WITHOUT ERRORS

In figure 9 and table 4 is shown a comparison of the average Total Test Scores of operators with and without errors. The average test scores decrease with increasing number of errors. The differences between averages are reliable ones.

An analysis has been made of the operating errors of substation operators with Total Test Scores above and below the passing score of 75. The average number of errors of 30 operators who make the passing score of 75 or above (0.43) is less than one-half of that of operators making Total Test Scores below 75 (0.94). The difference is a completely reliable one.

$$\frac{\text{Diff}}{S.\,D.\ \text{Diff}} = 17.0.$$

In figure 10 is presented an analysis of the percentage of operators with 0, 1, 2 or more errors, and 3 errors, respectively, making a Total Test Score of 75 or more. The chart shows that the percentage of operators who fail to reach the passing score of 75 varies directly with the number of errors.

An examination of figure 10 shows further that if the tests had been used in the employment of these 84 operators, 100.0 per cent of the operators with 3 errors would have been rejected; 92.3 per cent of the men with 2 or more errors and 62.1 per cent of operators with 1 error would have been rejected, whereas 57.1 per cent of operators with 0 errors would have failed to obtain employment.

It is important to note that of the 24 operators with 0 errors who make Total Test Scores below 75, only 4 or 16.5 per cent are in the group of Best operators, the remainder being in the groups which may be described on the basis of ratings, as generally less satisfactory employes.

THE VALIDITY OF THE TESTS

It is felt that the evidence presented above, including a comparison of operating efficiency and test scores of 84 substation operators, corroborates the validity of the tests in selecting competent operators and justifies their use as an employment instrument in the selection of assistant operators to be trained in substation operation.[10]

TEST SCORES AND OPERATING EFFICIENCY OF SENIOR OPERATORS

In addition to employes with the rank of Operator there is on the service roll of the Substation Section a group of men known as Senior Operators. They perform exactly the same duties as Operators, but instead of rotating shifts, the senior operator works only on the day shift. In addition, he is to some extent responsible for housekeeping in the station, for the assignment of cleaning to be done by the operators, etc., although he exercises no direct supervision over the other men in the station. Senior operators are found only in one-man-stations, that is, in stations in which there is no more than one man on a shift at any one time. Men have hitherto

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[10] It is of interest to note that when validation was started, there was available Total Test Scores for only 21 of the operators of the Average group, with rating scores ranging from -1 to $+1$ inclusive. The addition of the remaining Average operators in two distinct groups at successive periods has not materially changed the differences revealed among the Best, Average and Poorest groups. This is a further indication of the reliability and of the validity of the differences in test scores among these operators.

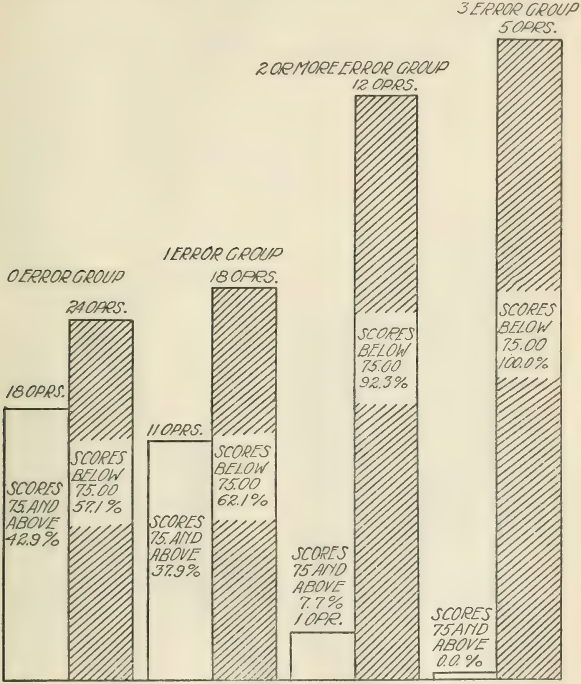

FIG. 10. TEST SCORES AND OPERATING ERRORS OF 84 SUBSTATION OPERATORS

been appointed as Senior Operators almost solely on the basis of seniority. During January, 1929, in order to complete the service records maintained in the Substation Section office, 15 of the senior operators were tested.[11]

In table 5, and in figure 11, is presented a comparison of the Average Total Test Scores and Average Number of Errors of Senior Operators and Operators.

It can be seen that, from the point

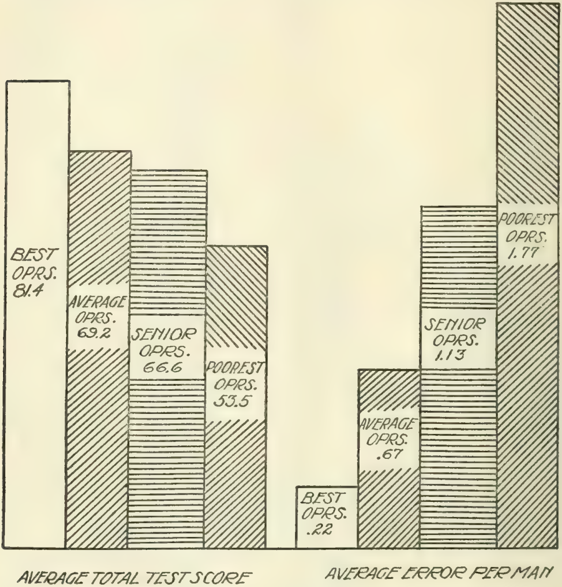

FIG. 11. AVERAGE TOTAL TEST SCORES AND AVERAGE ERROR PER MAN OF 84 SUBSTATION OPERATORS AND 15 SENIOR OPERATORS

of view of average number of errors per man, the Senior Operators rate below the group of Average operators. In the same way the average Total Test Score of Senior Operators is below that of operators in the Average group. An analysis of the differences in average Test Score between various groups of operators and senior operators shows the difference between the Best operators and the Senior Operators is a significant one. The difference in Average Test Score between Senior Operators and Average operators only borders upon reliability as can be seen from table 6. The evidence suggests that from the point of view both of operating efficiency and capacity the senior operators resemble a cross section of the entire group of operators and not a selection of superior material.

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[11] In January, 1929, there were on the payroll of the Substation Section 26 senior operators. Of these, 7 senior operators of 50 years of age and over, were excused from the psychological tests by reason of age. Four of the seniors had been tested as operators and are included in the comparison of the test scores and operating records of operators which has been presented above.

TABLE 5

Comparison of average total test scores of 84 substation operators and 15 senior substation operators

GROUP	NUMBER IN GROUP	AVERAGE TOTAL TEST SCORE	S.D. OF AVERAGE TOTAL TEST SCORE
Best	17	81.4	13.6
Average	54	69.2	13.5
Senior	15	66.6	13.9
Poorest	13	53.5	15.6

An analysis of senior operators with Total Test Scores of 75 and above showed that these men averaged 0.67 errors per man between January, 1926, and September 30, 1928. On the other hand, senior operators with test scores below 75 average 1.25 errors per man in the same period. In other words, men in the latter group were responsible for twice as many errors per man as those in the first group. The relationship between senior operators with scores above and below the passing score almost duplicates that found in the case of the 84 operators in the experimental group.

These facts concerning senior operators are presented as further evidence of the validity of test scores in distinguishing among the various degrees of operating ability.

TABLE 6

Reliability of differences in total test scores between senior operators and operators

GROUPS COMPARED	DIFFERENCE IN TOTAL TEST SCORE	$\frac{\text{Diff.}}{\text{S.D.}\ \overline{\text{Diff.}}}$
Senior and Best	14.8	12.1
Senior and Average	2.6	2.8

TEST SCORES AND OPERATING RECORDS OF 35 ASSISTANT OPERATORS

In addition to studying the relationship between test scores and the operating efficiency of operators and of senior operators, it has been possible to examine the relation between test scores and the progress of assistant operators. On March 15, 1929, there were 46 assistant operators in the employ of the Substation Section. Of these 35 had been examined on Series A and Series B either before employment or shortly after employment, and in addition, had been working as assistant operators for a period of at least 6 months.[12]

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[12] Five assistants had been excused from the tests by reason of age. The remaining six had been employed for less than six months.

Assistants tested after employment were those hired before the tests were put into operation as part of the routine of selection on March 1, 1928.

THE PHILADELPHIA ELECTRIC COMPANY

OPERATING DIVISION—SUBSTATION SECTION

STATION PERSONNEL PERFORMANCE REPORT

Name.. Date..

Position .... Substation ....

Employe Rated by..

Instructions for making out this report: Rate this man on the basis of the actual work he has been doing since the date of the last report. Before attempting to report on him it is necessary to have clearly in mind the exact qualities on which he is being rated. For this information read the definitions very carefully. In each quality compare the man with other assistant operators who have worked under you. Place a check on the line directly above the term which best describes the man's standing on the quality. If you think that he rates somewhere between the two terms, you may place a check mark between them.

1. General Operating Information Consider the man's knowledge of the substation, including wiring diagrams, the nature and purpose of the equipment, and the other general information about the job that has been given him; as found in the Operating Handbook, Circular Letters, etc.	Unusually detailed	Well informed	Fairly complete	Meagre	Altogether inadequate
2. Routine Operating Procedure Consider the man's reliability and thoroughness in making routine readings and observations.	Makes accurate and complete readings and observations	Seldom makes errors and omissions in readings and observations	Often makes errors and omissions in readings and observations	Observations and readings must usually be checked for accuracy and completeness	Altogether untrustworthy
3. Routine Switching and Blocking , Consider the man's ability, accuracy and carefulness in doing *assigned* routine switching and blocking	Does the job very accurately and carefully	Can generally be depended upon	Occasionally careless and inaccurate. Must be corrected frequently		Makes errors. Very careless. Undependable

5. INTERRUPTIONS, EQUIPMENT FAILURES AND UNUSUAL OCCURRENCES Consider the man's habits in reporting unusual conditions and his ability to handle minor troubles or unusual occurrences in the substation.	Very effective in all new or unusual circumstances	Usually reports unusual occurrences and usually able to handle most unusual circumstances without difficulty	Occasionally neglects to report trouble. Is able to get by	Neglectful in reporting trouble and becomes "Lost" when the unusual happens, but manages to handle the situation with help	Generally irresponsible. Loses his head completely. Unable to handle any unusual situation
6. ROUTINE CARE OF BUILDING AND PROPERTY Consider how well the man performs his duties in exercising routine care of the building and property.	Always does his job very well	Usually does his work O.K.	Just gets by	Often has to do the work over again	Always makes an unsatisfactory job
7. CO-OPERATIVENESS Consider the man's success in co-operating with the other members of the substation force, i.e. in working smoothly with the others.	Actively seeks to co-operate	Usually willing to do as the rest of the men do	Occasionally co-operates	Difficult to get any co-operation	Not at all co-operative
8. INDUSTRY Consider the man's application to the duties of the job, day in and day out.	On the job all the time	Usually on the job	Just gets his work done	Has to be continually prodded to get work done	Neglects work consistently
9. ADHERENCE TO GENERAL REGULATIONS Consider the man's adherence to regulations covering conduct in the station, uniform, reporting, and other general Company rules.	Excellent	Generally satisfactory	Usually lax	Negligent	

10. **REMARKS** (Place here any additional comments about the man's progress that you care to make)

FIG. 12. SAMPLE FORM: PERFORMANCE REPORT

On March 15, 1929, at a conference attended by the Superintendent of Substations, the Assistant Superintendent of Substations, and the five District Supervisors, each of these 35 assistant operators was given a rating of Best, Average, or Poorest, indicating the group of assistant operators in which he belongs according to the judgment of the majority of these men. In making these ratings the supervisory officials were guided by the records of progress in the training course and in the substation which were available in the case of these assistant operators. To understand the character of records on which the judgment was passed, it is necessary to know something of the training and follow-up program which is employed by the Substation Section in preparing assistants for substation operation and in following each assistant's progress on his job.

The training course given to assistant operators extends over a period of a year. The course consists of two parts; (*a*) systematic instruction in substation operation under the supervision of a substation foreman or senior operator; (*b*) instruction in the first principles of electricity and in the theory of electrical equipment, given in a Headquarters School.

The assistant spends the first week of employment in the school. For the remainder of the year he attends the Headquarters School for 2 hours each week. At the close of every three months the assistant is given a written examination on the theory of electricity, a written examination on substation equipment and an oral and practical examination on substation practice in the station. The results of these examinations are reported to the Substation Office, and were considered by the supervisors in the selection of the Best, Average and Poorest assistant operators.

In addition to these reports on training the assistant is periodically rated by foremen or senior operators with reference to his performance in the station. These ratings are made on a Substation Personnel Performance Rating Sheet (fig. 12) at the close of every six weeks of employment. These ratings are forwarded to the Substation Office and in addition to the training record, entered on the card maintained in that office embodying a complete record of the assistant's service in the Substation Section.

In addition, the supervisor is in constant contact with the substation and is familiar with the progress of assistants and others in the substations under his supervision. Moreover, at three months intervals, members of the supervisory force, including the Superintendent of Substations and his assistant, meet and carefully consider the progress of each assistant. At such meetings special actions in the form of recommendations and transfers, follow up, etc., are taken and the results recorded.[13]

All of this data was at the disposal of those attending the conference at which each of the 35 assistant operators was rated Best, Average, or Poorest. Those making the ratings were not, at the time, familiar with the test scores of the assistant operators. As a result of a detailed consideration and discussion of this data, 10 assistants were selected as belonging to a group of Best assistant operators; 16 as belonging to a group of Average assistant operators, and 9 as belonging to a group of Poorest assistant operators.

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[13] Foremen's ratings have been carefully analyzed with reference to the foremen's tendency in rating and the results of this analysis are available to supervisors at these periodic conferences.

A comparison has been made of the test scores of these three groups.

Figure 13 and table 7 present a comparison of the Average Total Test Scores of the Best, Average, and Poorest assistant operators. The Average Score for the Best group is approximately 8 points above that of the Average and 19 points above that of the Poorest group. The differences in Average Test Scores among the three groups are in every instance completely reliable.

TABLE 7

Average total test scores of 35 assistant operators

ASSISTANT OPERATORS	NUMBER OF CASES	AVERAGE TOTAL TEST SCORE	*S.D.* OF AVERAGE TEST SCORE
Entire group	35	79.3	13.0
Best	10	87.72	9.3
Average	16	80.00	12.7
Poorest	9	68.76	9.3

Figure 14 is a comparison of the three groups showing the percentage making Total Test Scores above and below the passing score of 75.[14]

An examination of this chart shows that whereas only 33.3 per cent of assistants rated in the Poorest group make a score of 75 and above, approximately twice this percentage of Average assistants and nearly three

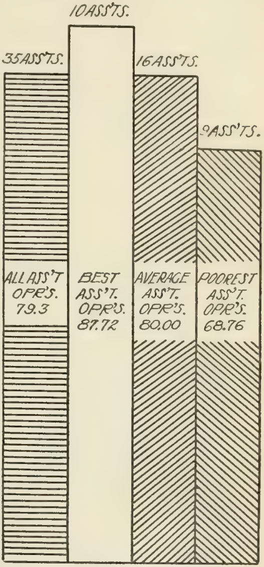

FIG. 13. AVERAGE TOTAL TEST SCORES OF 35 ASSISTANT OPERATORS

times this percentage of Best assistants make the passing score.

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[14] Certain of these assistant operators were hired prior to March 1, 1928, the date on which tests were installed as part of the employment routine. In addition, the tables for computing Total Test Score were not available for a few months after this date. This situation accounts for the fact that 13 of the present assistant operators have test scores below 75.

The percentage of assistants rated as Poorest falling below the passing score of 75 is six times that of the Best assistants.

A further analysis of test scores in comparison with ratings is embodied in figure 15 showing the percentage of assistant operators on each score level rated as Best, Average and Poorest assistants respectively. The extent to which the low test score entails an increasing tendency to be rated in the Poorest group and vice versa can readily be seen from an examination of this chart.

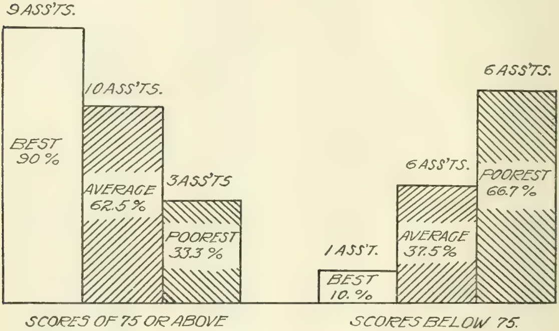

FIG. 14. BEST, AVERAGE, AND POOREST ASSISTANTS MAKING SCORES ABOVE AND BELOW 75

In the interpretation of figure 15 it must be remembered that the number of assistants in the Average group is somewhat larger than that of either the Best or Poorest group. The chances for falling in the Average group are therefore somewhat increased. To show the true relationship existing among the groups as compared to what can be expected on the basis of chance each of the Average columns should be reduced by about one-third.

TEST SCORES AND LABOR TURNOVER OF ASSISTANT OPERATORS

A preliminary analysis of test scores has been made with a view to comparing the relationship between the test score and labor turnover of assistant operators. It was found that 19 assistant operators, for each of whom a Total Test Score was available, had left the service between March 1, 1928 and February 28, 1929.

The Average Test Score of assistant operators who have left the service is 74.5 or 4.8 points below the Average Test Score of those in service. This difference is a completely reliable one.

$$\frac{\text{Diff}}{S.D.\,\text{Diff}} = 5.60$$

In figure 16 is shown a comparison of the percentage of assistants with scores of 75 and above who have remained in the service as compared with those making a Total Test Score below 75. It can be seen that the percentage of assistants making less than the passing score who have left the service is decidedly greater than is true in the case of assistants who have made a Total Test Score of 75 or more.

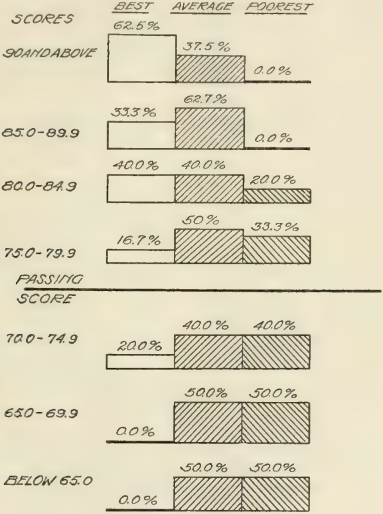

FIG. 15. ASSISTANT OPERATORS AT EACH SCORE LEVEL RATED BEST, AVERAGE, OR POOREST

SOME CONCLUSIONS ABOUT ASSISTANT OPERATORS AND THE TESTS

A review of the data for assistant operators confirms the conclusions which have already been reached concerning the validity of the tests of Series A and B as instruments for the selection of satisfactory employees. The figures presented in other sections of this report show a definite tendency on the part of men with high test scores to make more satisfactory operators than those with the lower test scores. The comparison of test scores of assistant operators and their performance in the station show that in the case of assistants a predisposition toward satisfactory service is likewise definitely associated with a satisfactory test score.

It is planned to examine this tendency further by comparing test scores with the efficiency of assistants after they have become operators and served as such for a period of time. However, the immediate findings concerning assistants are of utmost significance in further corroborating the value of these selection tests for substation operators.

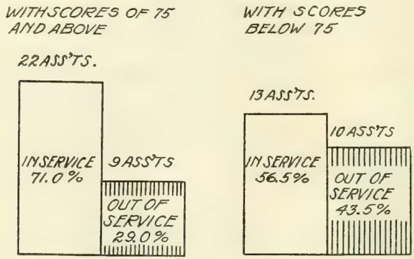

FIG. 16. TOTAL TEST SCORES ABOVE AND BELOW 75 FOR ASSISTANTS IN SERVICE AND OUT OF SERVICE

EFFECT OF PRACTICE ON TOTAL TEST SCORE

During March, 1929, the tests in Series A and B were given the second time to a group of 18 employees with the view of determining in a preliminary way the effect of practice upon test results and the reliability of the test battery. It would, of course, have been desirable to re-examine a larger group. However, the fact that approximately two and a half hours are required for the tests, the inconvenience of taking men from the job for re-testing, and other factors made it necessary to limit re-examinations at this time to the lowest possible number.

The selection of employees for re-testing was made in such a way as to give a wide range of from low to high scores, but the range is not quite as wide as that for the entire body of employees considered in the earlier sections of this report. In other words, from the point of view of range of scores, those who were re-examined constituted a somewhat more homogeneous group than the larger group of employees, but the average score and standard deviation of this special smaller group is close to that of the larger group.

The re-examination took place approximately ten months after the first examination. In table 8 is shown a comparison of minimum, average, maximum scores, etc., of the first and second trials on Series A and Series B.

The results show that although the maximum of the Total Test Score remains constant, there is an increase of eight points in the Average Total Test Score on the second examination, leading to the conclusion that practice somewhat affects performance upon the battery of tests.

TABLE 8
Effect of practice upon total test scores
(18 cases)

	MINIMUM SCORE	MAXIMUM SCORE	AVERAGE SCORE	STANDARD DEVIATION
Original examination	60.8	101.0	79.5	13.9
Re-examination	67.7	104.5	87.3	11.8
Examination of 84 operators	26.0	100.3	69.2	11.6

In addition to analyzing the actual gain from practice, it is important to determine whether practice tends to increase all scores proportionately, that is, whether gain appears in the case of low, average and high scores in almost equal proportions. To be reliable, a test or a battery of tests must be a consistent measure of the relative capacity of the members of a group to whom the examination is given. On a repetition of the test battery, each individual in a group must maintain a position varying little from his rank on the first application of the tests.

The extent to which each individual of the group who was re-tested on Series A and Series B maintains his rank is shown graphically in figure 17.

The degree of reliability has also been determined by a correlation of the Total Scores of the first and second trials on series A and Series B. This gives a Coefficient of Reliability of +0.79 (*P.E.* ±0.06).

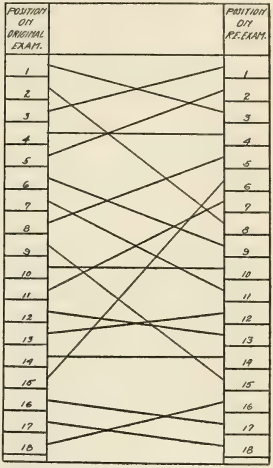

FIG. 17. POSITION OF 18 EMPLOYEES ON TEST REEXAMINATIONS

The degree of reliability indicated by this coefficient may be described as satisfactory in the light of the standards usually applied in the construction of tests.[15] It is particularly satisfactory in view of the somewhat more limited range of scores of the group subjected to re-examination as compared with the men in the experimental group; in view of the limited number of cases and in the light of the many variables in the way of changed attitudes, etc., which are present in the case of adult employees subjected to re-examination on the same tests.

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[15] "If a test is given twice to the same group of subjects and the second set of scores is correlated with the first, the correlation is never perfect. It is often very far from perfect. Such correlations between

THE USE OF THE TESTS BY THE SUBSTATION SECTION

The tests described in this report have been employed for more than a year in the selection of substation operators and in connection with the transfer and promotion of other employees. A brief description of the routine procedure used in hiring assistant operators may be of service in showing the place of the tests as administrative units in the selection of competent employees.

Notice of vacancies is sent by the Employing Officer of the Substation Section to the Employment Bureau. Applicants are received by this bureau, and those found suitable in the preliminary interview are given a medical examination.[16]

Those who pass the medical examination are given the psychological tests by an examiner, in a room removed from the Employment Office.

The results of the examination are recorded on a form, known as the Test Profile which shows not only the Total Test Score for Series A and B, but the applicant's score on each test in comparison with the performance of Best, Average, and Poorest operators.

This profile has the advantage of showing graphically the position of the applicant on the tests in comparison with those of employees with known efficiency. The profile also reveals whether the applicant's performance tends to be fairly stable on a given level, or whether there is a marked irregularity in performance, as shown by exceptionally high or low scores on single tests.

In addition to preparing this objective statement of test results, the

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independent measures of aptitude or test capacity are called 'reliability coefficients.' In practice these coefficients range from zero up to nearly perfection, or +1.00. The minimal reliability coefficient of measures usually considered necessary for use varies considerably with circumstances. Usually a test is not considered of much value if its reliability coefficient falls below 0.50." (Clark L. Hull, *Aptitude Testing*, p. 231.)

"It is a matter of judgment as to how high a reliability coefficient must be in order that the test may be regarded as satisfactory. Certainly, a coefficient as low as 0.50 represents little reliability. Perhaps we may say that 0.70 is the lower permissible limit of such a coefficient. Anything below this means that the test gives very variable results when repeated. We may, however, consider this as fairly satisfactory." (Frank N. Freeman, *Mental Tests*, p. 72.)

"To be a reliable measure of capacity, a mental or physical test should—generally speaking—have a minimum reliability coefficient of 0.80. This minimum will vary with the group, however, as the reliability coefficient is considerably affected by the range of scores made on the test." (From H. E. Garret, *Statistics in Psychology and Education*, p. 269.)

[16] In deciding upon the suitability of the applicant, the Employment Bureau makes use of an Application Score weighting such factors as age, marital status, education, etc., which was prepared by the writer in the course of this analysis of substation operation and the qualifications of the substation operator.

examiner prepares a statement of his observations of the reactions of the applicant during the examination. This is placed on the reverse side of the test profile form and on separate sheets attached to it.

A detailed statement of the objective score and a description of the quality of performance on Series C (Switching Control Test) is also recorded.

The examiner makes his recommendation directly to the Employing Officer on a form used for this purpose. (Fig. 18.)

ENTRANCE EXAMINATION

Date..............

Mr...

was examined on...

His psychological test rating is..

He is recommended—not recommended for employment in Operating Department.

....

Consulting Psychologist

FIG. 18. SAMPLE FORM USED BY PSYCHOLOGIST

The examiner indicates whether or not he recommends the applicant for employment and gives a rating of Poor, Fair, Good, etc., on the basis of his performance on the tests.

The Employing Officer of the Substation Section makes the final decision on whether or not the applicant is to be employed. Those who are employed are sent by the Employing Officer to the supervisor of the district in which they are to work. The supervisor is held responsible for assigning the new employe to the substation, for making arrangements for enrollment in the substation training course, etc.

In addition to their use in the selection of assistant operators in the Substation Section, the tests have been found valuable in selecting operators for transfer or promotion. So, for example, operators for newer, larger substations have been selected partly on the basis of test scores, with very satisfactory results.

In addition, the test scores are being used for the consideration of the status of employees who become responsible for errors.

This report has been limited to a description of the development of the testing program in the Substation Section. A comparison has also been made of the operating efficiency and test scores of electrical employees in the Generating Stations, leading to the use of these tests in the selection of such employees. There is also under way an analysis of the work of load dispatching and the qualifications of load dispatchers. However, a detailed description of these other studies will not be included in this report, which has for its objective a description of accomplishments in the selection of competent substation operators.

(Manuscript received May 29, 1929.)

The Grades of Labor

A Key for Job Classification and Appraisal[1]

By J. O. Hopwood, *The Philadelphia Electric Company*

Out of his experience as Superintendent of Employment with the Philadelphia Electric Company System, Mr. Hopwood has developed an equitable and convenient plan applicable to any industrial organization for the establishing of initial wage rates and the determining of promotional increments for all grades of service.

LARGER and larger numbers of people are being engaged in the several enterprises of our industrial life and it is necessary to coordinate and evaluate their services in order reasonably to insure the individuals a just return with progress as they become proficient. This must be done if we are to obtain a full measure of coöperation and maximum output.

In any undertaking the results attained depend largely upon the point of view from which we work. In taking up the present discussion, it is important, therefore, to consider two points of view in industry as to the nature of an enterprise and the shifting of modern thought from the one viewpoint to the other.

The first, we may call the individualistic view. It is the older view, handed down to us through a long tradition. It evolves from conditions of master and servant relations. The employer on one side and the employee on the other represent two opposing interests. It is the legal view of the relationship between employer and employee because primitive society knew nothing else. The contract is the basis of employment and stands like a barrier between the two parties preventing their union. The employer owns the business. The employee works for him and is called his hired help.

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[1] This paper, as originally written, was presented at the meeting of the Philadelphia Personnel Association on March 19th, 1929. It was discussed by Dr. R. H. Lansburgh, Professor of Industry of the University of Pennsylvania and former Secretary of the Department of Labor and Industry of the State of Pennsylvania, with reference to his work in classification and administration for that commonwealth; and by Dr. C. C. Balderston of the Wharton School of the University of Pennsylvania with reference to studies which he is conducting with Leeds and Northrup. Scope of functions as the concept in grading, rate ranges with coordinated maximum and minimum limits to supersede market rates, the idea of unity and centralized administration were emphasized as fundamentally important. Dr. Balderston called attention to the great fertility of this field for further study and the importance of extending and applying it. The discussion was broadened by Dr. Morris S. Viteles of the Department of Psychology of the University of Pennsylvania who stressed the desirability of making distinctions between *graded* classes and *functional* classes. The close parallelism of the service grades and workers' intelligence was pointed out by Dr. Viteles, who also mentioned the parallelism between functional class differences and differences in individual specific abilities other than general intelligence. As a result of these contributions to the discussion, several parts of the subject matter of the original copy have been extended.

Labor is treated as if it were a commodity and economists applied the theory of supply and demand to wages. Wages are considered as entirely competitive. We hire today and fire tomorrow if we can find cheaper labor. A business is one man's enterprise. Profit is his objective. The employer's natural interest is to pay as little as he can for as many hours of labor as he can get. The employee's interest is to give as little as he can for as much as he can demand. The condition is "Every man for himself and the Devil take the hindmost." Employees organize themselves as classes to gain bargaining power and exact demands from employers. The spirit of the enterprise is entirely autocratic.

The demonstrated results of the practical application of such an economic theory are:

Class consciousness
Constant industrial strife between social classes
Larger numbers for a given production than necessary
Great economic waste
Small purchasing power in the community
Profits comparatively small and restricted to a few persons
Low standards of living in general.

For a long time this view prevailed and still does in many quarters but a marked change has been taking place, particularly since the War. One thing which has helped to bring this about is what is probably the most important discovery in the industrial world in recent years—that high wages to large numbers means purchasing power in the community and consumption of goods; that the employee must consume, in exchange values, in proportion to what he produces; that large business depends upon returns to employees as well as to employers.

This is a new idea in business and in economic theory and the entire structure of the enterprise is changing, largely because of it. Business leaders are getting a new point of view.

The second view, then, we may call the coöperative view. According to this view, the enterprise tends to develop towards intensive organization. In a real sense, organization is the scheme of coöperation. It has two essential characteristics (1) specialized division of labor; and (2) complete integration to function as a whole.

We are familiar with the first characteristic but not so much so with the second.

The organization is one body of individuals working together as a whole to produce something as a common interest, usually a service with commercial value in the community.

Individuals are members, not "help," dependent upon each other throughout, each with a responsibility. Every job relates to others in the system of the whole.

Economy and returns to individuals

depend upon getting the greatest output from the smallest number of individuals. For example it can often be shown that four men at $125 per month (total $500) will accomplish as much as six at $100 (total $600). The wages are 25 per cent higher but the cost 20 per cent lower. There is economy in small numbers at good wages instead of large numbers at small wages. Business in the improved product grows and, in the end, more can be employed. Men have enough money to buy and keep others employed in other enterprises. Standards of living are raised.

What is good for the whole is good for the individual and the individual's welfare is good for the whole. If your wages are higher than ours it is to our advantage because your employees can buy our service and enable us to pay better wages. There should be no such thing as a standard wage in the community.

There is no line of division between employer and employee. The contract is lost sight of as there is one objective for all. All are employees with differing rank; and the employees *are* the company in so far as its functions are concerned.

The spirit tends to become democratic because management must discern and heed the expression and morale of the individuals. Class consciousness is suppressed as the individual assumes particular functions and responsibilities and the organization tends to become an institution in the community.

Jobs acquire tenure and the individual makes progress. He makes a real investment of time and energy.

The approach to the problem at hand is simple but it depends upon accepting this coöperative point of view:

1. Consider the entire organization as a unity—one body of persons working together to produce something as a whole, as a common interest.

2. Consider its human functions as made up of the positions or jobs of its individual members, who are the units of organization.

The division of labor will then present an aspect according to the outline on page 117.

Figure 1 is a composite of (1) the Outline of the Grades of Service; and, (2), a series of rate ranges, one for each grade, coördinated to follow the general trend of the payroll and adjusted so that the maximum rates as a series and the minimum rates as a series, each, will form an ascending curve, the curves becoming wider apart with the ascent.

There is latitude in each rate range for four or five rates with approximately 10 per cent differences in order to permit increases from the minimum to the maximum as individuals make progress in their work. Greater latitude is unnecessary because the *functions* of a person justly rated higher should be of sufficient scope for distinction as a more responsible job with its higher rate range.

Monthly rates only are shown but hourly rate equivalents can be readily computed.

Rates and responsibilities should go hand in hand. Figure 1 presents a scale for appraising both the job status and the rate range. The rate ranges derived may be raised or lowered as a

OUTLINE OF THE GRADES OF SERVICE IN ORGANIZED DIVISION OF LABOR

Classification Scheme for Grading Positions

Grades and Sub-Grades

Executive Service

Staff or Advisory Service

Supervisory Service

Routine Service

1. *General Management:* Establishes general procedure, organizes and directs the enterprise as a whole; makes decisions of general scope; adjusts relations with investors, the public and the personnel. (President, Vice President, General Manager, etc.)
2. *Departmental and Associate Management:* Establishes, organizes and directs procedure of major departmental scope or of inter-departmental scope but specialized or limited as to function—administration of a major department or subdivision of the organization, original investigation or research, invention, composition of data for informational and advisory purposes in general or major departmental administration. (Managers of departments and principal subdivisions, higher executive and staff assistants or their equivalents.)
3. *Major Supervision or Highly Technical Service:* Execution of intricate operating practice by delegating activities and giving general directions to others in diverse occupations, depending upon their knowledge and experience for the performance of the tasks involved; observation and judgment of high order, involving the application of standards and analyses of established character; or, directly performing activities of a highly technical character but essentially established by higher authority and experience; resourceful application of courses of action. (Intermediate subdivision chiefs, technical assistants, superintendents, foremen, etc.)
4. *Highly Skilled Service or Minor Supervision:* Service involving observation and judgment of high order with the application of standards and analyses of established character, and intricate, complicated or exacting details dictated by authority and long experience, subject to general supervision only—necessitating at least several years' experience in training; or supervision of others in work of less technical character but requiring some degree of skill.
5. *Skilled Service:* Service with features as in the next higher grade but less intricate and exacting and subject to more supervision, necessitating experience of from one to two years in training; may include detailed direction of others in service of lower grade.
6. *Semi-skilled Service:* Routine work of limited scope requiring only short periods of experience or training (several months) for its successful performance; may include detailed direction of others in service of lower grade.
7. *Slightly Skilled Service:* Tasks of simple character requiring only simple observations and responses with little learning and experience for their successful performance—subject to close direction.
8. *Primary Service:* Tasks and routine of very simple character such as may be performed by junior workers, workers in early apprenticeship or similar elementary training and workers in manual service of simplest character.

I. *Management*—Formulation and development of general procedure and courses of action or policies, involving original observations, analyses, the establishing of standards, etc.; the original planning, organizing and executing of operations.

II. *Operating Practice*—Supervision of or the direct performance of activities essentially established by authority, instruction or direct experience.

whole, on a percentage basis, without changing their relationship, and are thus adjusted to possible changes in conditions in the industry and to the productive efficiency of the organization.

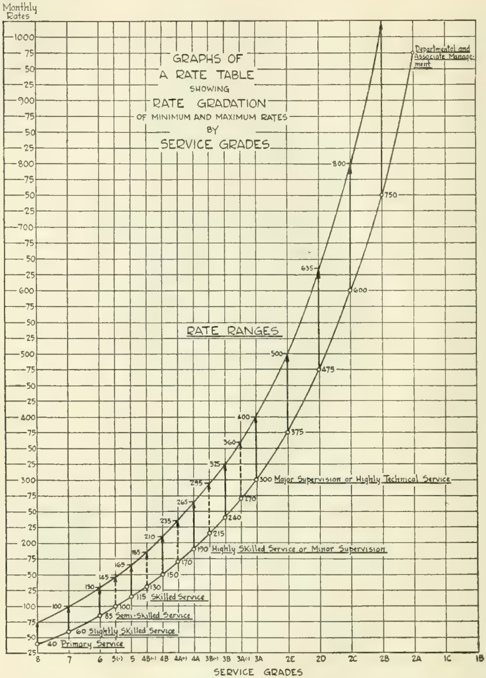

FIG. 1. COMPREHENSIVE WAGE SCALE SHOWING EQUALIZED RATES AND RANGES FOR PARALLEL GRADES OF SERVICE

Key positions in each department or class of activity are placed on the scale; related positions are weighed with them and interpolated between each other until the jobs throughout the entire system are brought into harmonious alignment or coördination, and in this way service of the same grade is equalized in all departments.

It is not the functional class of a job which determines its status, but rather its functional scope, for this is the measure of its control in its particular field and in the organization as a whole. The question is not, for example, as to whether accounting is more important than designing, but what is the scope of a particular accounting position or of a particular designing position. The one which is the more comprehensive is of higher status.

Table 1 illustrates a possible grading of positions in a series of functional classes which is capable of being extended indefinitely. A parallelism between the service grades and the mental grades (expressed in general terms of score made in an intelligence test similar to the Army Alpha) also is shown. The general intelligence of an individual limits his attainments as to grade while other traits determine his fitness for work of particular functional classes.

THE VALUE OF CHARTING AND GRADING

The subdivisional groupings of positions together with lines of authority and responsibility can be readily worked out by organization charting, as shown in figure 2, and this procedure gives not only the desired perspective but also an analysis highly important in appraising the grades of positions.

A grading of the administrative positions is revealed by this analysis of the organization into departments, divisions, sections, branches, units and groups. The administrative position at the head of each subdivision is brought definitely within the bounds of a small number of grades as indicated by the grade designations at the right of the chart. Administrative positions of widest scope in departmental and associate management rank as of the grade 2A. Subordinate positions, successively, grade lower. As the chart is worked out, various stages of subdivision are seen and the number and relations of the subordinate positions are revealed. Comparisons can then be readily made between an administrative position and its subordinate and superior positions, also between coördinate positions in parallel lines of subdivision.

It will be noted, in examining the chart, that certain subdivisions rank more than one stage below the subdivisions immediately superior to them in authority and that staff relationship is indicated by curved lines.

Administrative positions, as key positions, can be used as one basis of approach to the positions immediately subordinate to them. Sometimes, the foreman is only one step ahead of the subforeman and the subforeman only one step ahead of a highly skilled or skilled mechanic. Then, from the opposite direction, we may distinguish a more or less complete series in any functional class such as the groupings on page 123 suggest.

TABLE 1

*Coördination of service grades and rate ranges. Plan for differentiation in division of labor in industrial enterprises**

SERVICE GRADES		FUNCTIONAL CLASSES							RATE RANGES	MINIMUM INTELLIGENCE GRADES
		Accounting	Boiler Operating	Clerical Service	Designing	General Administration	Machine Construction	Selling	Monthly Basis	
I. MANAGEMENT:										
1. General Management	A					President			$2,500–4,500	A
	B					Vice President			1,700–2,800	A
	C					Gen'l Mgr.			1,250–1,850	A
2. Departmental and Associate Management	A	Comptroller							$975–1,350	B
	B								750–1,025	B
	C	Gen'l Auditor							600– 800	B
	D				Mechanical Engr.			Sales Mgr.	475– 635	B
	E	Auditor				Executive Asst.	Plant Supt.		375– 500	B
II. OPERATING PRACTICE:										
3. Supv. or Highly Tech. Service	A	Sr. Accountant			Chief Designer			Jobbing Salesman	$300– 400	B
	B	Accountant			Senior Designer		Machinist Foreman		240– 325	C+

4. Highly Skilled or Minor Supervision	A	Jr. Accountant	Boiler Engr.	Chief Clerk	Designer		Machinist 1st Cl.		$190–	265	C+
	B	Bookkeeper	Asst. Boiler Engr.	Senior Clerk	Asst. Designer		Machinist 2d Cl.	Salesman in Sales Room	150–	210	C
5. Skilled Service		Asst. Bookkeeper	Boiler Operator	Clerk A	Junior Designer		Bench Hand		$115–	165	C
6. Semi-Skilled Service			Stoker Operator	Clerk B	Draftsman		Machinist Helper		$85–	130	C–
7. Slightly Skilled Service			Ashman	Asst. Clerk	Tracer		Laborer		$60–	100	D
8. Primary Service				Junior Clerk	Junior Tracer		Shop Boy		$40–	75	D–

* Titles, placements and rate ranges are illustrative only.

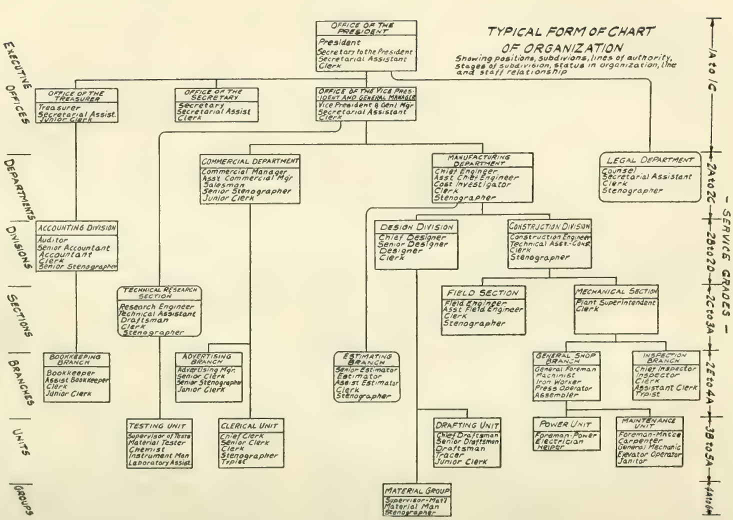

Fig. 2. Typical Form of Organization Chart Showing Line and Staff Relationships

(1)	(2)	(3)
	Chief Designer	
	Senior Designer	
Machinist 1st Class	Designer	Chief Clerk
Machinist 2d Class	Assistant Designer	Senior Clerk
Bench Hand	Junior Designer	Clerk Class A
Machinist Helper	Draftsman	Clerk Class B
Laborer	Tracer	Assistant Clerk
Shop Boy	Junior Tracer	Junior Clerk

In addition to the alignments in a vertical direction, we can make comparisons laterally between positions in parallel series.

THE JOB SPECIFICATION

Another important aid to the grading of labor is the Job Specification which is simply a written description of the duties, necessary general and technical knowledge and experience, physical qualifications, personal and other requirements of the job, prepared in concurrence with the incumbents and supervisors to serve as a reference background to a job title, so that titles will have real meaning and the same meaning throughout the organization. In addition to the data collected from incumbents and supervisors, the examiner should secure information by personal observations and analyses. Each job specification should be as complete as it can be made, but not so specific that superficial changes in the duties of individuals will necessitate its constant revision. Generally, a job specification is specific with respect to an organization and would not be usable without revision, for a similar job in other organizations. Some jobs, like the bolts and screws of machines are more or less standard, but others like the pistons, cylinders and other major parts, are not interchangeable between different organizations. There can be no such thing as a real standardization of jobs among different organizations.

Job specifications, in giving a clear picture of the duties and requirements of each position, facilitate the development of tests and interviews in addition to the assistance which they give in making classifications and appraisals.

CHANGES AND PROMOTIONS

A successful organization is not static and as changes take place, charts and job specifications must be revised and some positions must be regraded but, if there is any degree of stability, this should present no serious obstacle.

The problem of promotion is allied with classification. As previously shown, the functional classes provide direct lines for promotion as vacancies occur and the individual is qualified for advancement. The individual may be advanced also by passing into allied lines but his advancement more usually is accomplished by the gradual growth and extension of his functions which from time to time warrant his reclassification. For example, a Junior Stenographer becomes a Stenographer and later a Senior Stenographer and Secretarial Assistant; or a Helper becomes a Mechanic, and so on.

SOME GENERAL RECOMMENDATIONS

Departmental officers should be and all employees might well be acquainted with the accepted personnel principles and policy of the organization. All procedure pertaining to employment and classification should be centralized and directed by a competent personnel officer with as many assistants as may be necessary in order to maintain close contacts with departmental officers.

It is desirable that the personnel officer compile and maintain departmental lists of positions and that he supply each departmental officer with the list for his subdivision. The department supervisor should concur in the appraisals and conform to them in all assignments and rate increases. Time limits for rate increases should be established; for example, three months for positions in grade eight, six months for those in grades six and seven and one year for higher positions. Limits of 10 to 12 per cent as to amounts can be fixed arbitrarily or the theory of preferred numbers utilized.

An established classification and wage plan is of distinct advantage in connection with the preparation of the annual budget, the making of organization changes and various decisions and problems arising in general administration.

Such a plan evolving from the joint deliberations of what has been in this paper termed "Operating Practice" and "Management" rather than arising from the latter division alone would do much to eradicate one of the major causes of industrial disputes.

(Manuscript received April 3, 1929.)

Some Problems in Junior Placement[1]

By Clare Lewis, *Vocational Service for Juniors, New York*

After ten years of notable accomplishment the Vocational Service for Juniors is taking account of stock. In this paper Miss Lewis vividly states the problems that a placement service of this character necessarily meets in such a complex social and industrial community as the American metropolis.

THE Vocational Service for Juniors, in its ten years of placement work for boys and girls in the continuation schools of New York City, has found itself confronted by a number of varied and complex problems. Some of the difficulties it faces are of a kind more or less common to all placement work; others have to do more particularly with the specialized task of handling junior workers in a continuation school.

Taken by and large, the problems faced by this placement office may be grouped under three main heads:

1. Those incident to the mere location of the bureau in New York City;
2. Those resulting from the kind of applicants to be handled; and,
3. Special problems—connected particularly with placement work in a continuation school.

Each will be considered in turn.

PROBLEMS INCIDENT TO LOCATION

Every locality, of course, from an employment workers point of view, has its own peculiar problems,—problems which vary both with the nature of the particular industries to be dealt with, and with the type of employers found in those industries. The random mention of a few cities at least may serve in making clear what is meant.

In the State of Ohio, for instance, there is Akron—that well known center for the rubber industry. Here the mammoth rubber factories, employing thousands of workers, and the offices and laboratories connected with them, all modern in construction and equipment and thoroughly American in management, naturally absorb the greater part of the working members of that community.

In the same state there is Youngstown with its enormous steel mills with their demand for foreign born labor and with a relatively small amount of competition for workers, on the part of any other industries in the community. Portsmouth with its shoe factories and Sebring with its potteries, each demands specialized workers only.

In the south there are tourist centers such as Jacksonville or Miami, where work of all sorts is distinctly seasonal. In such towns as these the predominating demand is for restaurant and hotel workers. Office help employers, the majority of whom, like the hotel owners, are northerners, often prefer the migratory but better trained stenographers and typists from the North (snow birds they call them) to the girls from Florida and neighboring states.

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[1] Paper presented at the Cleveland meeting of the National Vocational Guidance Association, February 21, 1929.

A quite different situation is found in the typical leisurely southern city such, for example, as Columbia, S. C., where the main demand for workers comes from the seven cotton mill villages in the immediate vicinity. In these villages the rent exacted from each family for occupancy of its company owned house varies with the number in that family who work in the mill. Undoubtedly this arrangement explains the tendency for boys and girls without question to follow their parents into the mills. These mill boys and girls may be lured away for a time to the wretchedly paid jobs in the small stores of Columbia, but sooner or later almost inevitably, the mill draws them back again.

Still different conditions are to be met in such cities as St. Louis, Kansas City, or Cleveland. The latter city is devoted primarily to the metal industries—including automobiles—and to the garment trades, but it offers also a great variety of other occupations to its workers. Here, too, as in many mid-western localities, we find many plants of large size, employing hundreds of workers each, with progressive American born employers, many of whom are vitally interested in all problems having to do with hiring, and with the training, and promotion of their employees.

In contrast with such situations as just described employment conditions as they currently exist in New York City are infinitely complex and differ distinctly, at least in some respects, from those in any other city in the country; and these conditions affect both junior and adult workers.

As a background to a more complete understanding of just what any New York City placement worker must face let us, then, present some of these differences. A Manhattan placement office such as the Vocational Service for Juniors is, for instance, confronted by such conditions as these:

1. An almost unbelievable number and an extreme diversification of industries.
2. Space in Manhattan is at a premium and rents are high, consequently in place of the more or less isolated cotton mills of the South or the huge modern plants of the Middle West, we find in New York thousands upon thousands of small one room loft factories as they are called—(scores of them in one building, perhaps)—and each employing from four or five to possibly fifty workers.
3. Each industry or business is fairly well centralized as to location and each neighborhood employs its own particular type of worker.
4. One must deal not only with many progressive American born employers similar to those found in the Middle West, but also with an extremely large number of foreign born employers many of whom have brought with them to America and still retain, in their employee relationships, an old world idea of bargaining,—as opposed to the more progressive system of fixed salaries and regular periods of promotion.
5. An indifference on the part of many of the factory employers in both small and large factories to any problem having to do with personnel. Organized employment

departments of any sort are, in Manhattan factories, the exception rather than the rule.

6. In contrast with the indifference of factory employers, one finds the huge department stores and the mammoth banking and similar commercial organizations of the financial district with their highly centralized personnel departments exercising meticulous care in the selection and training of employees.

7. Everywhere is evident, in factories, stores, and offices alike, that atmosphere of feverish rush and turmoil which betrays the extreme keenness of competition to which every New York City manufacturer and business man is subject.

Such are some of the conditions in New York City as they appear to the placement worker. What problems do such facts as these create from the point of view of an employment office? These problems are several.

1. *Necessity for Knowing Zones or Districts.* As in no other city in the country probably, the placement worker, dealing as does the Vocational Service for Juniors with all types of firms, must familiarize herself with the various employment zones or districts and the type of worker called for in each. Fifth Avenue, for instance, is not like Sixth; nor is Tenth Avenue like Second. The wholesale textile district of Worth and Leonard Streets differs radically from the other textile district on upper Fourth Avenue; and the worker on the lower East Side is an absolutely different type from the one employed at Madison Avenue and Fiftieth Streets. Such facts as these in all their detail the placement worker must learn.

2. *The Problem of Planning and Preparing for Field Work.* Because of the extreme number and variety of occupations to be dealt with, combined with the fact that the majority of New York employers, whether interested or not, can be induced to give only the barest minimum of time to furnishing information, all field work attempted by the placement office must be more carefully planned and prepared for than is perhaps necessary elsewhere. This requires:

(*a*) A very definite planning of all visits made to employers so that superfluous travel may be eliminated and as much ground covered as possible.

(*b*) That the field worker before interviewing employers must have a more thorough background of preliminary information than might be necessary in some other cities. In a city like Cleveland a placement officer could readily learn the superficial differences between such machines as a drill press, planer, punch press, screw machine, lathe, etc. by seeing them in operation in a factory and having them explained to her there. In New York, however, the average employer usually will not take time for any such explanation. Consequently the field worker, to familiarize herself with such machines, unless she has acquired that familiarity elsewhere, must depend to a considerable degree upon trade schools or upon the Safety Exhibit at the New York Department of Labor.

3. *Need of Adjustment to a Great Variety of Industries and Occupations.* As a result both of the variety and general small size of the firms to be visited, the placement worker, from an office such as ours, in seeking opportunities for the applicants she serves, must adjust herself in her field work to continually varying situations. In the Middle West she might easily spend an entire afternoon with a single coöperative employment manager, going through just one plant while each job and its requirements were carefully explained. In New York, however, she may interview eight or ten different employers in rapid succession, each one, too, perhaps representing a different business. For instance, she may easily have a multigraphing concern, a wholesale florist, a furrier, a printer, an electrical repair shop, an artificial flower factory, a coat and suit house, and a retail luggage shop on her list, all in one afternoon and her task is to get equally adequate information about all these places.

4. *The Foreign Born Employer.* The presence of a certain number of the foreign born employers with their old world psychology, as we find them in New York,

creates an entire problem in itself. This is the group from whom it is most difficult to secure any really reliable information concerning the job itself—either as to hours, salary, or opportunity for advancement, since all such details, so essential to the placement worker in her dealings with boys and girls are, in the minds of many of these employers, just subjects for private bargaining between themselves and prospective employees.

5. Constantly Changing Firms. The extreme keenness of competition in New York also creates its problems for the placement worker. Because of competition, many smaller firms are either driven out of business completely,—many disappearing almost over night—or they combine with other firms under new names so that the employers' files in the placement office require constant and never ending revision.

To summarize briefly, then, we may say that the main problems which face the Vocational Service for Juniors simply by reason of the location of our placement office in New York are:

1. That of knowing the various employment zones or districts.
2. The problem of very carefully planning and preparing for field work.
3. That of adjustment on the part of field workers to a great variety of industries and occupations.
4. The problem of the foreign born employer.
5. That of continually revising our files to keep pace with the unusually rapid changes in firms.

We are ready for a consideration of the second group of problems mentioned at the outset of this discussion.

PROBLEMS RESULTING FROM THE KIND OF APPLICANTS TO BE HANDLED

A placement office in a continuation school, like a state employment bureau for adults, must deal with a very wide variety of applicants. The state law in New York permits children to go to work at 14 but requires that all boys and girls under 17 years of age, (except high school graduates) who leave regular full time school to go to work, shall, until they reach the age of 17, attend a continuation school one half day a week. As a result of this regulation the continuation school, and its placement office also, must be prepared to deal with boys and girls of varying ages, educational background, and grades of intelligence. In addition to handling this continuation school group the Vocational Service for Juniors has, also, extended its service to boys and girls between the ages of 17 and 20. Our office, then, attempts to place applicants who range in age from 14 to 20 years.

Our organization is engaged at the present time in making a detailed study of the registration cards of nearly thirty thousand boys and girls who have applied to us for work during the past ten years. That study is as yet incomplete but a few figures from it may here be of interest in giving a clearer idea of the kinds of applicants with whom our placement office must deal.

Out of a total of exactly 27,678 boys and girls whose cases are being studied, approximately 98 per cent were white and 2 per cent negro.

In the matter of religion 13,875 or approximately 50 per cent were Catholic; 10,523 or nearly 38 per cent were Jewish; and 2,788 or nearly 10 per cent were Protestant. For about 2 per cent of the cases religious affiliation was not recorded.

In nationality these boys and girls

showed the widest possible variety. Of the total number 27,678, approximately 24 per cent were Italian; 23 per cent were Polish or Russian Jews; 16 per cent were of American born white parentage; 13 per cent German or Austrian, and 7 per cent were Irish. On 5 per cent there were no available data and the remaining 12 per cent were a miscellaneous group whose parents came from Russia, Hungary, England, Scandinavia, Belgium, Spain, Portugal, the Balkans, Switzerland, Turkey, Syria, Armenia, Holland, Japan, Central America, and various outlying islands.

In age approximately 48 per cent were under 16 years of age; 41 per cent were 16; and 11 per cent were 17 or over.

In educational background they varied as follows: Approximately 1 per cent were ungraded; 8 per cent failed to reach 7A; 35 per cent dropped out between 7A and graduation from 8B; 30 per cent were graduated from 8B; 25 per cent had some high school; and 1 per cent graduated from high school. Educational data were lacking for one per cent of the cases.

As an indication of the variation in mental capacity we have the results of 203 general intelligence tests given in our office on successive Mondays during the month of January, 1929. January is considered a fairly representative month for at that time our applicants increase both in number and variety owing partly to post holiday layoffs and partly to the regular midyear influx of boys and girls from grade schools. Monday was chosen as being the day when employment office attendance is usually heaviest. These tests were given to all waiting applicants, or at least to as many as could possibly be persuaded to take them. Test scores for 126 boys and 77 girls supply the data for table 1.

From table 1 it will be seen that the IQ's of a representative group of applicants apparently range from 54 to 119 with the median for both girls and boys falling in the dull normal group. The heavy weighting toward the lower part of the group will be at once noted, but it should be strongly emphasized that these figures cannot be accepted without certain qualifications. They do not supply an entirely fair estimate of even the group tested and most certainly they do not give anything like a fair picture of continuation school students as a whole.

TABLE 1

Intelligence of applicants

	BOYS (126)	GIRLS (77)
I.Q.		
Range	58–117	54–119
Median	86	82
25th Percentile	74	72
75th Percentile	102	95
Rating		
	per cent	*per cent*
Superior	5	5
Normal	36	25
Dull Normal	23	29
Borderline	26	23
Feebleminded	10	18

In drawing any conclusion whatever certain qualifying factors need to be taken into account, such as the general confusion attending the giving of the tests and the unwilling attitude of many of the boys and girls who took them. One must remember, too, that any school placement office will always number among its clientele a larger per cent of incompetents than would be found in the school as a whole. Also there is the fact that the recent establishment in New York of the specialized continuation schools such as the Central Commercial Continuation School and Central Printing Trades Continuation School has resulted in drawing away from the general continuation schools like West Side many children, girls especially, from the superior and normal groups.

Even when such qualifying factors have been taken into account, however, we do feel that at least as far as our present group of applicants is concerned the classifications just given are not far from correct.

Such facts as these just given make it apparent that the boys and girls with whom the Vocational Service for Juniors is called upon to deal are, from every point of view, a most varied group and a group, too, whose capacities and desires as well, must necessarily spread over a wide range. This fact in itself brings with it certain very definite problems which a specialized employment bureau such as one catering to high school or college graduates, office workers, experienced domestics, or special classes of professional workers, may or may not be called upon to face. These problems are as follows:

1. A Necessity for Great Variety in the Jobs We Offer. The Vocational Service for Juniors, in order to satisfy the demands and needs of its widely varying clientele of workers, must establish contacts with a corresponding variety of employers in offices, stores, wholesale houses, and factories. Every type of work allowed by law to boys and girls of 14 to 20 years must be sought, and every kind of firm. In theory it is agreeable, perhaps, to think that the boys and girls who come to us for placement shall be referred only to firms where working conditions are good and opportunities for advancement definite, but in practice it does not always work out that way. In a placement office one deals not with theories but with plain unvarnished facts and in this connection the facts are these:

(*a*) Every child is an individual case and the task of the bureau is to get for him the best job which he, as an individual, is capable of filling.

(*b*) There are blind alley boys and girls as well as blind alley jobs. Many children of limited mental ability never will be able to fill anything else but a blind alley job and we may as well recognize that fact and act accordingly.

(*c*) As far as working conditions are concerned one does not always discard even the third rate place,—provided of course that the establishment keeps within the provisions of the labor laws. The reason is that some of our boys and girls, the foreign type especially, not only would not be accepted in establishments of higher grade, but they themselves would not take jobs there if they were offered.

The placement office of the Vocational Service for Juniors recognizes these facts, but still we argue that, by securing contacts with a wide enough range of employers we should be able even for the lowest grade of applicant who comes to us, to get a better job than that applicant could probably pick up for himself either by answering a newspaper ad or a sign in a window.

Again as another problem, and one akin to that just discussed, we have

2. The Necessity for Personal Visits to Employers. In a bureau such as ours there is greater need for personal contact with employers than is the case in a bureau handling adults. Phone contacts alone in an office for junior workers are not enough.

Both the immaturity and lack of experience of many of the applicants who come to us make it imperative that we shall know personally the employers and establishments with whom we deal. All firms should be visited personally preferably by the placement counselor herself.

3. The Unstable Adolescent. A third problem we face as a result of the age and kind of applicant to be handled is that of the unstable adolescent. We are dealing, of course, with a group of adolescent boys and girls, many of whom are naturally restless and prone to change jobs frequently and for the most trivial reasons.

There was Tony for instance, whose family desperately needed his help and who, because jobs were scarce, for days had looked vainly for work. Finally, since absolutely nothing else was available, we secured for him a job folding boxes in a paper box factory. A week later, however, he appeared in our office again and announced blithely that he had quit. "Tony," said I, "why did you quit when you know jobs are so scarce?" His reply was characteristic, "Gosh, Miss Lewis, dat job is so doity a fella has to take two baths a week. I don't woik no more in no such place."

Or there was Angelo who gave as his reason for leaving "The boss sent me out on lunch hour to get him a pickle. It was a Jew holiday and the delicatessens was all closed so I couldn't get no pickle. I come back and told him but he wouldn't believe me so I quit."

So it goes day after day and as a result, there are a number of firms whose names become very familiar since their calls are likely to be fairly regularly in our files. As one of our counselors, in a moment of discouragement, once aptly stated the situation: "It's just like that game, going to Jerusalem,—we play the music and they all just change chairs."

In a measure, too, this sometimes does seem true. Our tasks, however, in this connection are two:

(*a*) We must offer jobs of sufficient variety so that the unstable applicant ultimately does find his niche. (There was one girl of 16 who, within a period of two years, had worked in 52 different places before she finally did settle down and make good in the stock room of a knit goods concern.)

(*b*) We must educate our boys and girls to realize that any job deserves a fair trial; also that openings vary in number from month to month and consequently that they will be wise if they consult the placement counselor before they blithely quit a job, lest they find themselves unable to get another. Such ideas our placement office has circulated with considerable success, largely by bulletins issued to the teachers in the continuation school and by the use of charts in our office—charts which show the busy and slack seasons in junior work.

Our purpose in presenting such charts to our boys and girls is to emphasize the fact that there are good months and bad months to look for work. The months are not all alike. We have found from experience that there is a distinct seasonal variation in junior work in New York with the busy months coming in January, March, September, and October and the slack months in July and December. On the basis of figures for past years we can usually tell fairly well what to expect from month to month and so can advise the children accordingly. By such means much needless and unwise changing of jobs may be eliminated.

4. The Would-be Clerical Worker. As another problem incident to the handling of a varied group of applicants such as ours we have that bane of many a placement office everywhere,—the would-be clerical worker. By this we mean, not the typist nor the stenographer, but the girl who is absolutely untrained and who just wants "clerical work" as she calls it. This generally means doing a little filing, checking mailing lists, folding and enclosing letters, answering the phone, and engaging in other similar non-responsible pursuits. The familiar idea prevails even among young workers, that there is somehow a social stigma connected with factory work. Even when both working conditions and salaries offered are infinitely better in a factory than in an office, the girl invariably will choose the office job.

If we refer again to the study previously mentioned we find figures there which amply support these statements. Of 13,482 girls who applied during the ten year period, 3589 or approximately twenty-seven per cent asked for unskilled clerical work. Of these 3589 would-be clerical workers, only 1999 or fifty-six per cent secured the work they sought, at least on their first job. At the same time, only ten per cent of all the girls who applied expressed a wish for factory work, but more than three times that number ultimately took it. If we remember, too, the figures already given regarding the educational background of the applicants concerned and if we consider also the foreign homes from which so many of them come, the problem of the would-be clerical worker increases in difficulty. As a partial method of meeting this difficulty, we have attempted to weed out at least some of the most hopelessly unfit, by the use of clerical tests given in our girls' department. These tests do help in enabling us to pick, for the few jobs that are available, the best material we have; but, unfortunately for the placement counselor, they in no wise hinder the unfit from continuing their demands for office jobs. Clerical work simply does not exist in the quantity desired and the ceaseless demand for it is one of the most baffling problems with which we, as a placement bureau, are faced.

5. Girls Under Sixteen. Another problem, equally difficult, which comes to us too, as a result of the group we handle, is that of placing the girl under sixteen years of age. As previously stated, the law in New York does permit a girl to go to work at 14. Such a girl is, however, an unwanted wage earner. In the first place her very immaturity and lack of training are in themselves tremendous handicaps. Older girls are almost always preferred. Also there is the fact that the law, while allowing her to work, limits for her own good, both her hours of work and the kinds of work which she can do, the result being that automatically she is barred from many available jobs. Then, too, there is the general lack of correspondence between the kind of jobs the younger girl demands and the kind which are available. This is not the case with boys, for errand jobs which they will take are open to them, but with girls, the unceasing demand is for clerical work whereas most of the openings available are in factories. The problem is further complicated, also, by the prevailing small pay, lack of advance and temporary nature of most of the jobs which are open. Folding and enclosing letters, pasting stickers, trimming threads, sorting buttons, carding jewelry, acting as messengers in the stores—often just through the Christmas holiday rush,—such are some of the blind alley jobs open. Many of these younger girls, too, work, all told, less than three months a year, with frequent prolonged periods of idleness between jobs, a state of affairs which is, of course, in itself thoroughly demoralizing. These two years between the ages of 14 and 16 are in far too many cases simply lost time and worse.

To give concrete figures: Out of a total of 930 continuation school girls who applied at our office during the calendar year 1928, 558 or 60 per cent were under 16 years of age. This is some indication of the size of the problem. On the other hand, for these 558 girls, many of whom applied a score of times each (one girl was in 42 times during the year) there were available, all told, but 492 openings out of a total of 1613 calls for girls. Of these 492 jobs, 32 per cent were definitely known at the outset to be temporary. Or we might put it in another way by saying that for 60 per cent of our girls we had available only about 30 per cent of our jobs. The under-sixteen girl, fruitlessly applying for work, is, then, an ever present problem in a junior employment department.

In fact such is the state of affairs that the Vocational Service for Juniors almost refuses to regard these girls as primarily a placement problem at all. Our aim is rather to treat them as an educational problem and to use our influence in every way possible both to persuade them to return to full time school and, through bulletins circulated in the grade schools, explaining the situation, to prevent others, if possible, from attempting to become wage earners before they reach the age of 16.

6. The Jewish Applicant. The enormous Jewish population of New York City combined with the fact that there is such a widespread discrimination on the part of employers against Jewish applicants creates still another problem for the placement worker. In refusing to consider the Jewish boy or girl an employer usually will tell us one of two things. He may state flatly that he employs no Jewish workers whatever or, as is the case for instance, in many Wall Street firms, he may be a bit more diplomatic and say that the firm does take a certain proportion but that their prescribed quota is full. In either case, however, the result is the same. Even Jewish employers themselves often refuse to hire the Jewish boy or girl.

It appears to make no difference either that the Jewish applicant often has a better school background than the Christian. Our study of the 27,678 applicants previously mentioned shows, for instance, that 38 per cent of the Jewish children go to high school as against 18 per cent of the non-Jewish.

Nor does the fact that the Jewish worker is usually the more ambitious appear to help him much in the eyes of employers. Instead that very ambition and burning desire for "advance" as he puts it may be and often is the very cause of his being refused.

With this group also, as with the girls, under 16, there is the predominating desire for some kind of office work and here, to, that desire is coupled with an even greater difficulty of fulfillment.

Of 228 Jewish girls who applied to us in 1928, for instance, 147, or 64 per cent wanted office work. For these 147 girls there were available 367 office jobs. On the face of it this sounds well but further analysis reveals the following facts:

(*a*) Sixty per cent of these openings were for folding and enclosing letters or for hand addressing, etc. and were known at the outset to be strictly temporary—usually a week or less in duration.

(*b*) Thirty per cent more were the lowest paid and least desirable office openings we had, such as addressing envelopes, checking lists, and enclosing circulars, in mail order houses, etc.

(*c*) Ten per cent only or about 37 were office jobs really worth having.

With boys the situation is slightly different. They do not even get a chance at temporary work. Out of a total of 404 Jewish boys applying in 1928, 158, or 39 per cent wanted office work—a smaller per cent than with the girls but for these 158 boys there were available all told only 61 office openings.

The young Jewish worker then, in spite of his superior educational qualifications, is severely handicapped in obtaining the coveted white collar office job.

The general situation has, of course, been considerably aggravated by the months of increased unemployment through which we have recently been passing. Not only are employers refusing to employ the Jewish applicant, but apparently in some instances, at least, they are seizing this occasion when non-Jewish workers are available, to lower even further their Jewish quotas. Hence the problem is one of increasing difficulty.

7. *The Colored Applicant.* The colored boys and girls present still another problem to the placement worker. Especially has this been true during the last year, when openings for juniors in general have been relatively few.

As an indication of the seriousness of this problem we present the following figures. Whereas, out of the total ten year group studied only 2 per cent were colored, during the year 1928, 5 per cent of the girls and nearly 8 per cent of the boys belonged to this group.

Part of this increase has doubtless been but the natural result of the general rapid growth of the colored population in that part of Harlem from which some of our applicants come. Part, too, is probably accounted for by a quiet period in business and a consequent increase in the number of layoffs made by employers. Also financial stringency at home has caused a number of these boys and girls to leave school and seek work. But whatever the cause, these colored applicants are to be found in our office day after day and we are faced with the very definite necessity somehow of finding work for them.

To accomplish this, all firms in our files known to employ colored workers have been systematically solicited. Another method, too, which has proved worth while, especially in securing contacts with better grade firms, has been for the placement counselor simply to enter one of the huge loft buildings, particularly in the garment center, and ask the colored elevator operator there what firms in the building use colored workers. This information he is always more than willing to give and by following the leads thus supplied a number of openings have been found.

Also by noting where the largest group of negroes leave the subway in the morning and by canvassing that neighborhood, as near the noon hour as possible, when workers may be loafing outside, still other firms using colored people have been identified and a few more vacancies secured.

Try as we will, however, we have succeeded in placing all told only 39 per cent of the colored boys and girls who came to us this last year and we are still seeking other means of meeting the problem they present.

8. The Sub-normal Boy. Never has the question of adequately handling the subnormal or psychotic boy been a more formidable one from a placement point of view than it is in our office at the present time. Our estimate is that fully 10 per cent of our entire group belong definitely in the class of feeble minded, while the number of borderline cases is fully twice as large. What *can* be done with these problem boys? —that is the question. The Vocational Adjustment Bureau in New York handles girls of this type and subnormal girls applying to us are sent there, but as yet there is no agency in existence to handle the feeble-minded and psychotic boy. Hence we have them always with us—a perpetual drag upon the employment office machinery, not only on account of the fruitless time they consume (time better spent with the normal placeable boys) but also because we, like any other average placement bureau, simply are not equipped adequately to handle this special group. Yet not a day passes without bringing at least several of these unfortunates to us. Many of these boys have been idle for months,—they just drift—truants or definite delinquents. Some too are such trouble makers or such a definite moral menace to younger boys that we cannot even allow them to wait in the office. Many are, of course, well known to the attendance officers who are continually foisting them upon us—and to what purpose. In all justice to the other boys we simply cannot waste the few jobs we do have upon this utterly incompetent group, so they come to us day after day and we simply are not meeting the situation at all. A specialized bureau organized particularly to handle this group has long since been proposed and most certainly the need for it has never been more glaringly apparent in New York than it is at the present time.

We may now summarize briefly the problems resulting in our offices from the kind of applicants there to be handled. They are:

1. A necessity for great variety in the jobs we offer.
2. The need for personal visits to employers.
3. The problem of the unstable adolescent
4. The would be clerical worker.
5. The girl under 16.
6. The Jewish applicant.
7. The colored applicant.
8. The problem boy.

Such are some of the outstanding difficulties connected with placement work in an office such as ours, which must serve every type and grade of applicant who comes. They are problems, too, which demand attention more insistently than ever during a period of unemployment such as we have been experiencing in New York this last year.

Having now discussed the difficulties we face as a result of the mere location of our bureau if New York City and also those incident to the kind of applicant handled, let us then turn our attention finally to the third group of problems mentioned at the very outset of this discussion.

SPECIAL PROBLEMS ARISING IN CONTINUATION SCHOOL PLACEMENT WORK

A continuation school is, of course, a specialized kind of school organized to meet the needs of a particular group—working boys and girls. It is the one and only agency in the community which, for a time at least, regularly keeps in touch with that vast army of boys and girls under 17 who every year leave the regular full time school to go to work, and in this connection its opportunities for usefulness, especially in the field of vocational guidance, seem almost unlimited.

The teacher in such a school, of course, has her own problems—problems, however, which do not concern us here except as they are shared by the placement office,—and we do have many difficulties in common.

For a proper understanding of these difficulties, however, certain preliminary facts need to be known. Of interest, for example, from the point of view both of the teacher in the school and the placement worker are the answers to such questions as these: (*a*) What kind of vocational counseling and training has the child already had? (*b*) What were his reasons for leaving school? and (*c*) Is he physically able to undertake the work he proposes to do?

A check-up of the registration cards of all continuation school boys and girls who applied to us for placement during 1928 reveals the fact that these applicants came from 158 different schools, public and parochial, and that in only 14 of all the schools represented is there anything whatever offered in the way of organized vocational counseling. This fact in itself gives us food for thought.

Again comes the question many employers are prone to ask—*why* have these boys and girls left school to go to work? If we question the children themselves as to their reasons for leaving school, the replies are extremely varied and often, too, most picturesque as well as enlightening. Here, for instance, are a few examples:

"I had to help me mudder out."
"Teacher didn't want to loin me."
"Stepmother hollars to me to go to woik."
"Too many fights in school."
"Need money at home."
"I didn't loin much."
"Wanted drafting."
"Had enough."
"Got left back twice and quit."
"I graduated."
"Too much home work."
"I didn't have my head to it."
"Discarded from school."
"Me and school didn't agree."
"I was the tallest kid in school and got disgusted."
"Too much blah about the work in school."
"Wanted to take art."
"Wanted plumbing instead of commercial."
"Me fadder has too many guys in de house so I have to woik."
"Couldn't get my Latin."
"Failed in Spanish."
"Teacher told me to go to work."
"Teacher punched me in de eye."

The attempt has been made to classify the various reasons given over a period of ten years with this result. In 5,310 of the 27,678 cases, no reason was given. In the 22,368 remaining cases, the chief reasons for leaving school in order of importance appeared to be:

31.4 per cent	Economic
30.4 per cent	Family custom to leave
14.9 per cent	Disliked school and wanted to work
6.7 per cent	To work and go to night school
3.7 per cent	Over age
3.3 per cent	Failing—discouraged
2.6 per cent	Family illness
1.1 per cent	Trouble with teacher
5.9 per cent	Miscellaneous (6 minor reasons)

Such a classification is at best only approximate, of course, the reason being that each child may and very probably does belong in at least two of the groups mentioned. So far as it goes, however, it would appear to indicate that in a continuation school such as ours, one finds at least three general groups: (*a*) Those forced by economic pressure to become wage earners; (*b*) Those who because of family custom have simply never considered any education beyond the eighth grade; (*c*) The failures and misfits in the present school system.

Such then, are the groups with which we, as a placement office, must deal.

In the matter of securing reliable information regarding the physical fitness of the boys and girls who come to us the Vocational Service for Juniors is singularly fortunate for we have at the West Side Continuation School a first class medical clinic, which has been established through the efforts of the Public Education Association and which is the only one of its kind in the city. Every child who enters the school is given a thorough medical examination as a part of the regular entrance routine and this examination is followed by such treatment as may be necessary. A report submitted by the clinic for the 11 months from January 1, 1928 to December 1, 1928, may here be of interest.

Total number of pupils examined	3,332
Number needing treatment (approximately 73%)	2,435
Impairments found:	
Dental	1,340
Vision	685
Nutrition	498
Orthopedic	407
Throat	406
Skin	321
Posture and Muscular Development	253
Nasal	245
Glandular	232
Nervous	172
Pulmonary	157
Cardiac	152
Hearing	106
Menstrual	36
Speech	10
Hernia	7
Venereal	5
Genital	4
Total	5,036

A report such as this makes it evident, then, that a very large percentage of the children with whom we must deal are by no means one hundred per cent fit physically, and this fact we need to take into account. Indeed it may very well be that in just such figures as these may be found the real underlying cause of the previous malajustment of the child in school and his consequent presence in our office as a would-be wage earner.

With such facts as these as a background, we are now in a better position to discuss certain special problems with which we, as a continuation school employment bureau, in particular find ourselves faced. These problems are numerous but they may be summed up as one, that is:

The Double Task of Counseling and Placement. Owing to the fact already mentioned that the great majority of the children who come to us have apparently had no intelligent or systematic vocational counseling whatever, it becomes then, in practice, the task of the continuation school teachers and of the placement workers in the continuation school as far as possible to supply that deficiency. From the point of view of the placement office this may mean several things; it may mean:

(*a*) Making arrangements through our scholarship department so that the ambitious child of superior ability who has been forced for economic reasons to curtail his education may return to full time school.

(*b*) Trying to convince a discouraged child who very evidently has been a misfit in the school he has previously attended that there are classes offered at night where he can get training that will be definitely useful and persuading him to attend them.

(*c*) The placement worker also must coöperate fully with the medical staff in the school and make a special effort satisfactorily to place or replace those boys and girls whom the medical department pronounces physically unfit for certain lines of work.

(*d*) The double task of counseling and placement may mean also either individual or group discussions of occupations or of general business ethics. With the Vocational Service for Juniors the group discussions are conducted in both boys' and girls' departments of the employment office by a continuation school teacher assigned for that purpose and who is in charge of all waiting applicants. These group talks are most informal and cover a wide range of subjects. Aside from the specific occupational information given, such topics come up as, labor laws affecting minors, how boys and girls may work their way through high school or college, recreational facilities in the community, personal appearance and cleanliness as factors in success, how best to apply for a job by letter, the right of women to take men's jobs, causes of unemployment, reasons why certain applicants are refused by employers, etc. In all such discussions any information, occupational or otherwise, contributed by the placement worker, is utilized.

A chart showing reasons why applicants were not hired has aroused considerable interest and has formed the basis for a number of group discussions among our boys. This chart shows the 965 cases occurring in 1928 where boys were referred to jobs but failed to get them. These cases have been classified according to the reasons given us by employers for their failure to hire the boys in question. It is a well known fact of course that employers very often fail to tell an applicant frankly why he is being refused. They just put him off with some excuse and false ideas. Our theory is that our boys and girls, for their own good, should know the truth as the employer gives it to us and this is one of our methods of making that truth known.

(*e*) Finally, the placement worker must coöperate fully, of course, in the counseling program of the continuation school as a whole. This may mean giving talks to the teachers or issuing bulletins dealing with the current employment situation, or it may mean the circulation in the school of special up to date occupational studies made by the employment office staff.

It is apparent that the placement office in a continuation school may in practice have some very definite problems to face not only in the field of placement itself but in that of counseling as well.

Some of the problems reported in this paper are familiar to the average placement worker anywhere; others arise out of the location of the office and the nature of the applicants handled. In addition some of the situations which are to be met particularly in the placement office of a continuation school have been discussed.

In presenting these various phases of placement work, it is hoped as a result that the reader has gained some idea, at least, of the practical every day side of work in a junior placement office.

(*Manuscript received March 21, 1929.*)

Accidents of Older Workers: Relation of Age to Extent of Disability

By Albert Frederick Stevens, Jr., *New York*

The personnel executive wants all available facts as to differences between workmen in their susceptibility to accidents. Mr. Stevens, who uses the statistical approach, is at present in the graduate school of New York University.

Relationship of age of injured workman to the extent or duration of disability is tested for correlation. In general, the relationship is definite and positive for all injuries except for the one class "Burns and Scalds." This is a development quite unlooked for and presents a problem outside the scope of this treatment.

A special dispersion study is made of 1711 cases of "Cuts, Punctures, and Lacerations." In order to give each age-group proper weight, each variable is reduced to a relative of its group total. Curves are plotted which show that the mature workman is disabled for a longer period than the younger man and that frequency increases with age.

A DISABLED workman is an economic debit. Safety engineering has done a great deal to reduce this sort of loss, but in spite of every precaution some accidents are inevitable. What more can be done to keep the debit down?

If, as many think, there is a causal relation between age and time lost following an injury, this relationship should be evaluated. A careful personnel department will take this factor into account. Men in the mature age-groups can be put in jobs where the hazard is lowest and only the most expert and "safety minded" assigned to more dangerous types of work.

The relation between duration, or extent of disability, and age seems to be a field not widely investigated. It is of course recognized that with advancing years natural powers of recuperation diminish, so that a given injury is more likely to cause more serious disability in an older than in a younger man.

In addition to a failing in recuperative powers there are other factors leading to a prolongation of the period of convalescence that enter into the situation. The economic need, particularly among the workers over fifty is frequently, not acute; the impatience of youth has been somewhat tempered and the experience of years counsels the older men to tarry a bit before resuming work. And, while it is true that many of the jobs involving the more serious hazards are held by men in the median age-group of workers or by younger men, this is not so universal as is sometimes believed.

Men who are active in the administration of the Workmen's Compensation Law are of the opinion that much of the lengthening of disability among the mature age-groups can be traced to influences that are incidental to the injury. The older workmen take advantage of the opportunity to have a bit of vacation. This leads, in some cases, to stretching out a normal seven weeks' injury so that it runs into the period "more than 49 days" and thus they secure payment for the first seven days or "waiting period." We will not say that the desire to receive compensation for the first seven days does not have some influence in this direction, particularly among the low-paid class of wage earners.

The nearly 5,000 cases yielding data for this study are actual cases of injuries for which compensation has been granted by the Bureau of Workmen's Compensation. The measure of disability used is "days lost" which has come to be accepted as the standard unit for this purpose.

It should be noted that "extent of disability" as herein used does not include the first seven days of disability, except in those cases where the disability exceeds 49 days. The writer has followed the practice of the Bureau of Statistics, New York State Department of Labor, in this respect so that these figures may be comparable with statistics of that office.

The age classes 15–19, 65 and over, are not strictly comparable with the rest of the series. The first class 15–19 is made up mainly of young men and women 18 and 19 years of age. The class, 65 and over, though perhaps seemingly too inclusive is sufficiently homogeneous for all practical purposes.

Severity in this inquiry refers only to duration of disability and is not related, in any degree whatever, to the hours of exposure to the hazard. This investigation will be restricted to the attributes of age and length of disability. However, such statistics should be accepted with a clear understanding of their nature.

Because of the limited scope of this investigation, it was thought advisable to exclude both fatalities and permanent total disabilities; and to consider separately schedule losses, (*i.e.*, certain injuries which have been standardized for "days lost" by the Compensation Board, regardless of actual time needed for recovery) so that no group might be unduly affected by a fortuitous inclusion of an unusual number of large disabilities. The several classes of injuries are self-explanatory except the group covered in the series *All Other*. In this group are included concussions, foreign bodies (in eye, etc.), and asphyxiation.

The foregoing considerations have been referred to in order that it may be clearly understood that this problem is limited and circumscribed by certain practical difficulties which have been taken into consideration in this presentation of the subject. The analysis and the conclusions derived must necessarily be conditioned by the limitations that are germane to this type of statistical inquiry.

AGE, INJURY, AND TIME LOST

The data assembled for this inquiry is summarized in table 1. This

TABLE 1

Average length of disability resulting from industrial injuries. Classified by age-groups and nature of injury

AGE	CUTS, PUNCTURES AND LACERATIONS			BRUISES, CONTUSIONS, ETC.			FRACTURES, TRAUMATIC AMPUTATIONS AND DISLOCATIONS			BURNS AND SCALDS			SPRAINS AMD HERNIAS			SCHEDULE LOSSES			ALL OTHER			TOTAL		
	Total cases	Total weeks	Average weeks per case	Total cases	Total weeks	Average weeks per case	Total cases	Total weeks	Average weeks per case	Total cases	Total weeks	Average weeks per case	Total cases	Total weeks	Average weeks per case	Total cases	Total weeks	Average weeks per case	Total cases	Total weeks	Average weeks per case	Number of cases	Number of weeks	Average weeks per case
15–19	217	544	2.5	74	213	2.9	34	223	6.6	12	23	1.9	42	178	4.2	33	991	30.0	1	8	8.0	413	2,180	5.3
20–24	337	1,057	3.1	147	456	3.1	66	491	7.4	50	118	2.4	112	540	4.8	79	3,151	39.9	5	24	4.8	796	5,837	7.3
25–29	326	1,099	3.4	178	708	4.0	62	658	10.6	46	166	3.6	136	777	5.7	97	3,663	37.8	2	8	4.0	847	7,079	8.4
30–34	225	686	3.0	147	613	4.2	64	503	7.9	41	99	2.4	102	457	4.5	94	4,427	47.1	6	25	4.2	679	6,810	10.0
35–39	192	673	3.5	117	690	5.9	57	605	10.6	26	117	4.5	108	533	4.9	101	3,902	38.6	5	7	1.4	606	6,527	10.8
40–44	144	617	4.3	111	537	4.8	31	738	23.8	17	50	2.9	79	537	6.8	86	3,530	41.0	5	50	10.0	473	6,059	12.8
45–49	108	543	5.0	85	398	4.7	46	603	13.1	12	33	2.8	69	551	8.0	76	3,023	39.8	8	173	21.6	404	5,324	13.1
50–54	74	401	5.4	68	412	6.1	22	320	14.5	11	41	3.7	37	242	6.5	66	3,445	52.2	3	88	29.3	281	4,949	17.6
55–59	42	231	5.5	38	243	6.4	19	312	16.4	2	4	2.0	27	152	5.6	39	1,911	49.0	1	1	1.0	168	2,854	17.0
60–64	31	222	7.2	21	94	4.5	7	120	17.1	5	14	2.8	17	150	8.8	19	811	42.7	1	82	82.0	101	1,493	14.8
65 and over	15	146	9.7	13	139	10.7	8	115	14.4	2	3	1.5	4	43	10.8	17	800	47.1	1	35	35.0	60	1,281	21.4
Total......	1,711	6,219	3.6	999	4,503	4.5	416	4,688	11.3	224	668	2.9	733	4,160	5.7	707	29,654	41.9	38	501	13.2	4,828	50,393	10.4

tabulation by age groups shows for each type of injury, the total number of cases, the total number of weeks lost, and the average time lost per case. A close inspection of this data for the various classes of injuries reveals that there is considerable variation in the relation of age to the period of disability. This will be clearly seen when we study the trends. Scrutiny of the column showing the average weeks per case for the total of all injuries shows plainly that as the age increases there is a definite increase in the duration of disability except for the groups 55–59, and 60–64; the former showing a slight decrease and the latter a somewhat larger recession. If the age groups 60–64, and 65 and over, are consolidated we get an average disability per case of 17.2 weeks, only 0.4 weeks less than for the group 50–54, and only 0.2 less than for the consolidated group 50–59. The series in this column clearly indicates a close relation between severity and age. The slight falling off in the two groups mentioned above is not significant and is probably satisfactorily accounted for by the well-known fact that a great number of low-hazard occupations, such as watchman, sweeper, etc., are filled largely by men fifty years of age and over. The great increase for the last group demonstrates that in the ages 65 and over, there is very little resistance left and although exposure to severe hazards is at a minimum, time loss per injury is high.

TABLE 2

All injuries. Summary of the results of two investigations

AGE	CONSOLIDATED AGE GROUPS OF TABLE I			DATA ASSEMBLED FOR AN EARLIER STUDY		
	Number of cases	Number of weeks	Average weeks per case	Number of cases	Number of weeks	Average weeks per case
Under 20	413	2,180	5.3	93	514	5.5
20–29	1,643	12,916	7.8	372	3,249	8.7
30–39	1,285	13,337	10.4	276	3,495	12.7
40–49	877	11,383	12.9	178	2,455	13.8
50–59	449	7,803	17.4	85	1,551	18.2
60 and over	161	2,774	17.2	41	668	13.9
Total.......	4,828	50,393	10.4	1,045	11,932	11.4

Having summarized our data, the question of their validity naturally arises. Realizing that a total of less than 5,000 cases is none too large a sample, it was decided to check table 1, against a somewhat similar compilation which was made a year ago. In order to make this comparison it was first necessary to consolidate the age groups of table 1, so as to place these data on a ten-year basis. This has been done and is shown in table 2, which also contains the data developed from last year's investigation.

As we examine table 2, we find that there is a very considerable agreement in the trends of the two series. Each shows an average disability which, in general, increases as the age advances.

There is a notable difference in the average length or duration of disability of the two series. There is little uncertainty, in the writer's mind, as to the correct explanation of this difference. The earlier tabulation, quite by chance, included rather more than the usual proportion of schedule losses. This would, of course, have a decided tendency to lengthen the period of disability. It is significant that this difference is one of degree and not of kind, as will be clearly shown later. A study in detail of the data for the various classes of injuries shows that there is considerable variation in the ratio of age to disability.

TRENDS IN THE INJURY GROUPS

Trend factors for each type of injury have been derived (see Appendix A)[1] and these are the basis of the trend lines in figure 1. The trend line for the group All Other has not been charted because of insufficient data, there being three or less cases in more than half of the age-classes of this series. The trend factors for the series Schedule Losses and Total are seen to be nearly identical. Injuries classed as Sprains and Hernias, Bruises, Contusions, etc., and Cuts, Punctures, and Lacerations also are very similar in their trends. The foregoing trends are all positive. The series Burns and Scalds, however, has a negative trend factor, probably significant, but for which there is no ready-made explanation. Reference to the trend factor derived for this group of last year's data reveals it to have been −.11 which is fairly close agreement with the factor −.04 found in the present inquiry.

If it were assumed that the economic and psychologic influences for all types of injuries remain constant, attention could be directed to physiological considerations. Is it logical to infer that burns and scalds meet with greater resistance as the age of the injured advances? Such knowledge, if founded on fact, would have great practical value. If manufacturers whose productive processes require the use of corrosive acids, fire, hot liquids and metals, were cognizant of such a principle; and granting its operation, were led by their knowledge to employ older men where this hazard existed, accident records would undoubtedly reflect their sagacity.

DATA FOR ONE TYPE INJURY ANALYZED

In a study of this nature an airmap is too comprehensive. One needs to approach the subject as closely as possible. Since this is the case we will examine one group,—the series Cuts, Punctures, and Lacerations to learn what we may as to its dispersion. This group is the largest series in table 1 and should give representative data as to the nature of the dispersion.

We find that out of a total of 1,711 cases (see last column of table A, Appendix C), over 22 per cent are in the "less than one week" class; nearly 25 per cent are in the "one week but less than two" class; and nearly 17 per cent are in the "two weeks but less than three" class.

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[1] Appendix A, B, and C referred to, but not published herein are on file at the office of the Personnel Research Federation, 29 West 39th Street, New York, where they may be consulted.

This is for all ages. When this data is analyzed by age groups a different story is told. Since the number of cases constantly decreases after the maximum in the 20–24 class has been reached, it is evident that, as the table stands, it needs to be weighted by the proportion each age group bears to the total number of employed men of that age. This ratio can be approximated closely by the use of actuarial tables; or the necessity of weighting may be eliminated by reducing each item of each group to a relative of its group total. The latter procedure has been followed in table B (see Appendix C). Analysis of this table to determine where the largest relative number of cases for each of the time periods is located, gives us the series found in table 3.

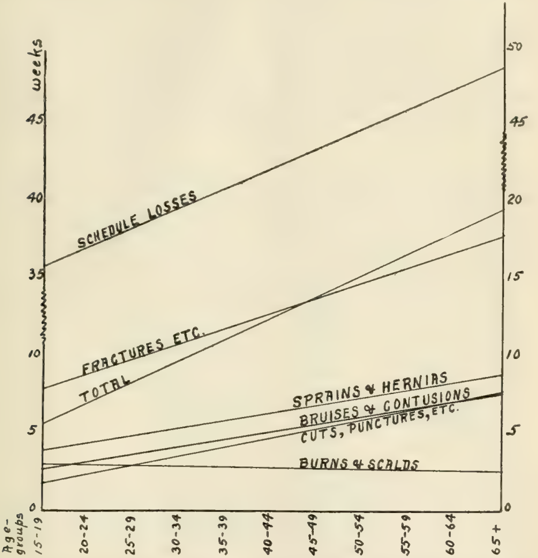

FIG. 1. TREND LINES FOR ALL INJURIES. DURATION OF DISABILITY IN RELATION TO AGE

[Based on data derived in problems found in Appendix A]

Table B (Appendix C) shows that

for the shortest time period the relative number of cases of cuts, bruises, and lacerations for each age group, in general decreases with advancing age; while for the median and maximum periods the ratio tends to increase with age. This brings out an important principle that sustains a vital relation to compensation expense. There is little question, as between the minimum age period and the maximum, which class deserves the most favorable rate. In the lower age group 83.3 per cent of the cases required less than 4 weeks for recovery; of the oldest only 46.6 per cent were able to resume work within four weeks after suffering an injury. Or stated another way, 16.3 per cent only, for the class 15–19, were disabled for over 4 weeks, while 46.6 per cent, approximately three times as many, in the oldest group run for a period greater than 4 weeks. This in substance means that not only will the average duration increase with the age period but that a relatively larger number of serious cases will fall in the more mature age classes.

TABLE 3

Age-groups having the greatest number of cases for each period of disability (cuts, bruises, and lacerations)

DURATION OF DISABILITY (WEEKS)	AGE-GROUP
less than 1	30–34
1 to less than 2	15–19
2 to less than 3	40–44
3 to less than 4	50–54
4 to less than 5	55–59
5 to less than 6	55–59
6 to less than 7	40–44
7 to less than 8	45–49
8 to less than 9	65
9 to less than 10	45–49
10 and over	65

CORRELATION OF AGE WITH NATURE OF INJURY

In table 4, we have compiled the coefficient of correlation, probable error, and standard deviation for each type of injury. The four groups having notably high correlation factors have a standard deviation running from 4.9 to 17.7. The two groups having coefficients of .73 and .60 have a standard deviation of 4.9 and 3.2 respectively. The probable error for all groups having positive correlation is so small as to be negligible except as it tends to confirm validity of the correlation.

TABLE 4

Coefficient of correlation, with probable error and standard deviation, for duration of injury and age

NATURE OF INJURY	r	P.E.	S.D.
Cuts, punctures and lacerations	.93	±.01	17.7
Bruises, contusions, etc.	.86	±.02	11.7
Fractures, traumatic amputations, dislocations	.73	±.03	4.9
Burns and scalds	.26	±.11	7.9
Sprains and hernias	.86	±.02	8.7
Schedule losses	.60	±.02	3.2
Total	.90	±.002	2.9

It is unfortunate that there is such a paucity of literature dealing with this phase of industrial injuries. Since there is nothing in print that might serve as a check for these data it would not be the part of wisdom to make any dogmatic assertions. Although the ground covered was somewhat limited, 4,828 cases, every care was taken to get a representative sample. The internal harmony of the data assembled is such as to offer rather convincing testimony that the cross section was sufficiently comprehensive.

It is safe to say that the foregoing analysis is ample authority for the conclusion that age and extent of disability are closely correlated except in the case of burns and scalds. The correlation coefficients range from .60 to .93 for the other injury groups. Whether the coefficients here derived indicate a real and characteristic difference between various types of injuries can only be determined by more extensive work in this direction.

Only one of the injury classifications, Burns and Scalds, was found to have a negative trend. The results of two studies would indicate that there is no correlation. There is, however, a substantial agreement as to the trend, which in both cases was negative, although too small to be conclusive. This constitutes an extraordinary and unlooked for development. Why Burns and Scalds should not agree with the other injuries in relation to age offers a problem that intrigues the imagination. Suffice it to say, this paper can offer no explanation that seems adequate to account for it. One can surmise but not conclude.

SUMMARY

The high correlation which was found to exist between age and duration of disability for all injuries except Burns and Scalds is concrete evidence that the older an injured person is the longer, in general, will be the period of the resultant disability.

(*Manuscript received October 9, 1928.*)

News Notes

PERSONNEL RESEARCH FEDERATION

ACTIVITIES OF MEMBER ORGANIZATIONS

Vocational Service for Juniors

SCHOLARSHIPS FOR THE TRAINING OF COUNSELORS

An increasing recognition of the value of vocational guidance on the part of educators in secondary schools and colleges, social agencies and progressive industrial organizations has brought about a demand for persons trained to do this work.

Departments of Psychology, Economics and Business Administration of certain universities have attempted to meet this demand by introducing courses in Vocational Guidance and Personnel Administration open primarily to graduate students. A theoretical study of the principles and scientific technique is thus provided but there is little opportunity for practical application of these principles. The need for giving prospective counselors some "training on the job" and some information along the lines of related activities is acutely recognized by executives of vocational guidance bureaus. It is in some cases felt to have even more significance than platform teaching.

As a means of providing this practical training the Vocational Service for Juniors has formulated the following plan, by virtue of a grant from the Rockefeller Foundation is enabled to proceed to the task of carrying it out. Five annual scholarships are offered; each provides an apprentice training program which shall offer to individuals fitted by educational background, personal characteristics and scientific ideals an opportunity for direct observation and practical experience in the technique of vocational and educational guidance and placement and the supplementary activities which constitute an essential part of the work.

In order to obtain the best possible training in each of its branches, and to secure a freedom from the limitation imposed by particular local conditions, this apprentice training is to be carried on in those cities especially selected for their outstanding development in particular phases of the work.

This apprentice training is to be concerned with the following topics:

1. Case work study of the social and economic backgrounds of individuals.
2. Psychiatric examination and treatment of mentally unadjusted individuals.
3. The giving, scoring, testing and evaluating of objective mental tests.
4. Curriculum making and the educational administration of a diversified program of study.
5. Procedure for ascertaining, and evaluating opportunities for vocational and cultural, recreational, and moral training.
6. The issuance of work-certificates and the administration of a school attendance department.
7. The formulation and administration of Labor Laws concerning
    a. Minors;
    b. Women;
    c. Workmen's Compensation for Injury;
    d. Safety regulations;
    e. Factory inspection.
8. Industrial investigations for placement.
9. Employment, welfare and training programs in industry.
10. The making of job analyses.

Throughout the training the necessity of securing, compiling, and treating educational, social, and industrial data in accordance with scientific principles and in the attitude of research will be emphasized.

Opportunity will be provided for direct observation and supervised participation in the activities concerned in the guidance and placement of individuals in educational and industrial system, mental hygiene clinics, state and federal departments, business organizations, and industrial and social research bureaus.

INDUSTRIAL SCIENTIST TO HELP PLAN CHICAGO FAIR

Plans for the international exposition to be held in Chicago in 1933 have advanced to the extent of the naming of a special committee of national leaders in all fields of pure and applied sciences to coöperate with the trustees of the Century of Progress,—as the exposition has been named. The ultimate form of the exposition has not been determined but its dominant note will be scientific progress in Industry. Cognizance will be given to the contribution of psychology to this progress: industrial psychologists have been asked to propose suitable exhibits. The personnel of the committee of scientists and industrial experts was chosen by the National Research Council and will be known as its advisory committee. The chairman of the executive committee is Dr. Frank B. Jewett, President of the Bell Engineering Laboratories. The six other members are Gano Dunn, Michael I. Pupin, William Allen Pusey, Vernon Kellog, George K. Burgess and Max Mason. Equally distinguished leaders compose the general committee.

GOVERNMENTAL SAFETY PLANS

In spite of the efforts of the Labor Department and in the face of protective laws the toll from industrial accidents in the State of New York has been rising every year. Governor Roosevelt during the latter part of June announced the personnel of a permanent commission of thirty-six leaders in organized labor to carry on a continuous campaign to reduce industrial accidents throughout the state. John J. Sullivan, President of the State Federation of Labor heads the commission. Three officials of the State Labor Department were named by Miss Frances Perkins, State Industrial Commission to coöperate with the commission. Over two hundred representatives of organized labor who attended a conference called by the Governor heard his statement of the need for immediate action.

In this connection the Recommendation to Governments adopted by the International Labor Conference which met in Geneva during June is of interest. The draft was in four sections. The first deals with research into the causes of accidents and methods of preventing them. The second with cooperation among states, employers, and workers for the prevention of accidents. The third refers to the legal obligations of workers and employees, and the fourth to the responsibilities of insurance companies. Agricultural as well as industrial workers are included in the provisions of the recommendation.

FEDERAL ADVISORY COMMITTEE ON EDUCATION

The Secretary of the Interior has named Dr. Charles R. Mann, director of the American Council on Education and a member of the Board of the Personnel Research Federation as Chairman of a committee composed of forty-six educators, which has been appointed to study the relations of the national government to education. Secretary Wilbur has divided the committee into three sections. Federal activities in education will be studied by the first section; federal grants to colleges by the second; and federal grants to schools of less than college grade by the third. J. W. Crabtree, Secretary of the National Education Association will serve as the General Secretary of this Advisory Committee on Education.

KEEPING UP WITH CURRENT RESEARCH

The June 22d issue of *School and Society* contains an excellent discussion of the problem students—of the social sciences in particular—face in keeping abreast of the research in progress at Universities throughout the country. Lawrence Heyl of the Princeton Library staff, author of the article lays stress on the extreme difficulty of learning of the existence of doctoral dissertations either in process of composition or completed and filed as typed copies in institutions not requiring printed theses from Ph.D. candidates. Several available sources for such information are mentioned and after pointing out their inadequacies Mr. Heyl suggests that an annual volume be published containing two lists: one of research in progress in connection with the preparation of doctoral dissertations in the humanistic and social sciences; the other giving complete information covering unpublished dissertations in all fields. Such a reference text would undoubtedly be invaluable.

The JOURNAL which a year ago made a suggestion similar to Mr. Heyl's would also like to see established a central source of information for currently undertaken extramural research. The student in the field of technopsychology would be greatly aided by a knowledge of controlled experiments and research activities carried on in industry of which undoubtedly there are many that remain unreported in scientific journals.

A UNIVERSITY POLICE CENTER

The University of Chicago is to establish a center for the scientific study of police work. August Vollmer, Chief of Police of Berkeley, California, who collaborated with Dr. J. A. Larson in the development of the Lie Detector, has been appointed Professor of Police Administration. One of the primary functions of this university police center will be research and it is planned to put the University in a position to act as a consulting agency in police matters. The entire resources of the institution in the social and natural sciences will be at the disposal of the new center. The curricula of schools for apprentice police officers, now maintained in many municipalities will be greatly altered and improved, as research findings in this new center become available for application.

FELLOWSHIPS AND OTHER GIFTS

The John Simon Guggenheim Memorial Foundation announces the establishment of a system of exchange Fellowships between the U. S. and Latin America. They will be granted for independent research and for training in the various professions including engineering and teaching. Special consideration will be given to applicants who wish to study political, social or scientific problems which are common to the countries of North and South America. The first of these fellowships will be granted in the Republic of Mexico early in 1930.

The Lifwynn Foundation for Laboratory Research in Analytic and Social Psychiatry, Inc., of Maryland (with New York offices in the Chanin Building) will receive approximately $350,000 as the sole beneficiary of the estate of John E. Hinskamp, philanthropist and student of sociology.

Through the generosity of Edward A. Filene in offering on behalf of the Twentieth Century Fund $25,000 for the purpose, the International Labor Office in Geneva will be enabled to gather the data Henry Ford desires for fixing wages in his European factories. The collection and publication of information concerning costs of living abroad is certain to prove of widespread value for many purposes in addition to that which motivates the study.

The University of Kansas has announced an annual scholarship bequest of $25,000 established by an alumnus of the University, Mr. S. E. Summerfield of New York, President of the Gotham Silk Hosiery Company. In addition the donor announces his provision for the transfer to the University after his death of an estate of half a million dollars to insure the perpetuation of the scholarships.

THOMAS WILLIAM SALMON MEMORIAL

The establishment of a $100,000 fund to perpetuate the memory of the late Dr. Thomas W. Salmon was announced by Hon. George W. Wickersham, Chairman of the Memorial. It is intended to stimulate study and research and to provide for dissemination of knowledge concerning the control and prevention of mental and nervous diseases. Awards for study will be international. The fund will be administered and disbursed by the New York Academy of Medicine.

FORTHCOMING MEETINGS

August 18–31. SOCIAL SCIENCE RESEARCH COUNCIL. Annual Meeting. Hanover, N. H.

August 19–23. THIRTEENTH INTERNATIONAL PHYSIOLOGICAL CONGRESS. Cambridge, Mass.: Harvard Medical School.

August 28–September 1. INDUSTRIAL DEPARTMENT OF THE NATIONAL COUNCIL OF Y. M. C. A.'s. Annual Conference on Human Relations in Industry. Silver Bay, Lake George, N. Y.

September 1–7. NINTH INTERNATIONAL CONGRESS OF PSYCHOLOGY. New Haven, Conn.: Yale University.

September 2–5. INTERNATIONAL CONGRESS ON COMMERCIAL EDUCATION. Amsterdam, Holland.

September 24–27. INTERNATIONAL ASSOCIATION OF PUBLIC EMPLOYMENT SERVICES. Philadelphia.

September 30–October 4. NATIONAL SAFETY COUNCIL. Chicago.

October 5. ASSOCIATION INTERNATIONALE DES CONFERENCES DE PSYCHOTECHNIQUE. Sixth conference. Barcelona, Spain.

October 14–. AMERICAN FEDERATION OF LABOR. Toronto, Canada.

PERSONAL ITEMS

CLARK HULL has been added to the staff of Yale's Institute of Human Relations. Dr. Hull who will be Professor of Psychology in the Institute's Section of Psychology is at present at Columbia University where he is giving courses in Psychology and Testing during the summer session.

Word comes from Switzerland that DR. FRANCISKA BAUMGARTEN has been appointed to the faculty of the University of Berne as *privat docent* for technopsychology (*psychotechnique*). She will head an Institute for Technopsychology shortly to be established there.

Miss CLARE LEWIS has been released from her post as director of employment for Vocational Service for Juniors to accept an appointment from the New York State Department of Labor.

Miss ANNE BYRD KENNON former irector of the Denver Collegiate Bureau of Occupations has been appointed Executive Secretary of the Personnel Bureau of the National Board of the Young Women's Christian Association.

Miss GERTRUDE STEIN director of Vocational Service, Inc. has just returned from France where she made a study of government employment agencies. Her study will be reported in the Bulletin of the American Association for Labor Legislation.

Book Reviews

LECTURES ON CONDITIONED REFLEXES

By Ivan P. Pavlov, M.D. Translated from the Russian by W. H. Gantt and G. Volborth. New York: International Publishers, 1928. Pp. 414

Reviewed by C. S. Yoakum

English speaking readers have at last available the brilliant researches of Professor Pavlov and his assistants. Together with *Conditioned Reflexes* published by the Oxford Press in 1927, this volume gives in quite readable form the essentials of method, experimental findings and theory which characterize the special researches in nervous physiology and animal behavior universally known as "conditioned reflexes." The volume before us is a series of selections from papers and addresses made before medical and scientific organizations. It is marred somewhat in literary unity by its numerous repetitions, inevitable in a collection of addresses made by the same lecturer. The editor has, however, undertaken in footnotes to indicate essential changes in method and in terminology which would naturally occur in twenty-five years of continuous experimental study. To one unfamiliar with the field, these repetitions are often more helpful than otherwise.

One of the interesting documents in the volume is the biographical sketch of Professor Pavlov by Dr. Gantt. This short sketch emphasizes the unusual physical and mental energy, the extraordinary memory for detail, and the persistent enthusiasm of this outstanding leader in physiological research.

The importance of the book lies in its description of the experiments. In so far as data presented are concerned, the reader cannot judge of their reliability. Recent reviews of the experimental papers listed in the bibliography maintain that the facts there given authenticate the summaries presented in this volume. Enough is given here, however, to arouse the imagination and to intrigue the reader interested in behavior. The book is packed with suggestive experiments and clues for further experimentation. The effort to avoid speculation leads to many remarks derogatory of psychological experimentation. The fascination of the mental field, nevertheless, leads to many attempts to explain psychological phenomena that seem bizarre and even naïve to the psychologist. It is, on the whole, a volume worth much perusing and offers many an opportunity to whet one's critical faculties.

PSYCHIATRY IN INDUSTRY

By V. V. Anderson, M.D. New York: Harper and Brothers, 1929. Pp. 339

REVIEWED BY C. MACFIE CAMPBELL, M.D.

Psychiatry within the last two decades has been becoming somewhat aggressive and has tended to invade the schoolroom, the law court and the factory. The invasion has sometimes met with distrust and it is, therefore, of great importance that psychiatrists, dealing with problems in these special fields, should be well documented, modest in their claims and helpful in their suggestions. The present book is written by a pioneer in this field, by one who came to the special field of industry with an already mature clinical judgment and who, after making himself at home in a special branch of the industrial field, puts his methods and his results at the disposal of fellow workers. The material which forms the subject matter of the book is the result of a four years' study of personnel problems in R. H. Macy & Co., Inc., New York City, which is one of the largest mercantile establishments in the country.

The book deals with quite concrete problems picked out from the innumerable topics which are open for investigation in such an environment. Thus, a whole chapter is given up to the study and treatment of failures in work, another to the selection of executives. The special contribution of psychiatry in industrial health work is reviewed in an interesting chapter. More technical economic discussions cover the field of job placement and of the specifications for particular types of activity. The author states his problems clearly, outlines the methods employed and presents the results of his investigations in regard to specific topics in a summary and convincing way. As a concrete example of what can be done in a complicated field through the application of the psychiatric point of view by a trained worker, the book makes a valuable contribution to those who are interested not merely in promoting efficiency in industry but in doing preventive work in the field of mental disorders.

PROCEEDINGS OF THE PARIS CONGRESS OF TECHNOPSYCHOLOGY

Comptes rendus de la IVme conférence internationale de psychotechnique, 10–14 octobre, 1927. Institut International de Coopération Intellectuelle. Paris: Félix Alcan, 1929. Pp. xvi + 686

REVIEWED BY W. V. BINGHAM

Among the eighty-five technical papers in this quarto volume of proceedings of the Paris Congress of Technopsychology will be found researches of value to industrial engineers, personnel executives, social workers, psychiatrists and educators, as well as to psychologists.

The Congress itself has already been described in this JOURNAL.[1] Representatives of 23 countries attended, from Palestine to Spain and from the United States to Uruguay.

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[1] W. V. Bingham, The Paris Congress of Technopsychology. PERSONNEL JOURNAL, 1927, 6, 295–301.

The venerable Dr. E. Toulouse, presiding, said that scientific organizations must be animated with the spirit of coöperation between peoples who, after all, have the same physiology. Education and methods of work benefit by international interchange of ideas. Technopsychology investigates the best use for human energies in all forms of social activity from the time of leaving school on. National societies of technopsychology are an initial step toward unification of methods and pressure on governments to introduce such methods. The essential features of technopsychology are experimentation, measurement, and their applications to the determination of the biological value of the individual in relation to his vocation, as well as the effort toward a physiological organization of work.

M. J.-M. Lahy, to whom Dr. Toulouse referred as perhaps the greatest practical exponent of contemporary scientific technopsychology, spoke in his capacity as Secretary-General of the Congress. Technopsychology, M. Lahy said, impels experimental psychology and physiology toward statistical method. We need to collaborate with mathematicians in order to evaluate the accuracy and reliability of that method, the significance of correlations, and the precautions necessary in their use and interpretation. Though there are thousands of tests, the number of validated tests having precise psychological significance is small; yet it is only those validated methods of measurement which can be accepted by men of science for international use. Technopsychology serves immediate social ends and in order to attain them we should be entirely disinterested. Our meetings should be a public, international self-examination, from which will emerge certainties upon which economic and political organizations will come to lean more and more heavily.

During the interval since the previous Congress (Milan, 1922) great progress has been made in technopsychology, the value of which needed to be appraised. But there was an embarrassment of riches, both as to subject matter and number of papers. The published proceedings differ from what was actually presented, in so far as they include many papers of capital importance which were read by title only. Mention is here made of representative themes grouped under eleven heads:

I. *Questions of Method:* (a) Principles. Personality study and the test method; behaviorism and psychodiagnosis; relation between psychology and technopsychology; physiology of conditioned reflexes, true basis of technopsychology; anthropological characteristics of technopsychology. (b) Technopsychological nomenclature of the occupations. (c) Statistical methods. The röle of mathematics and particularly of statistics in scientific research; correlation charts of intelligence and aptitude tests; evaluation of the accuracy of technopsychological measurements; a rational statistical basis for an industrial test; experimental determination of the form of relation between the variability of a test measure and the size of that measure; principles of construction of absolute scales.

II. *Tests:* (a) Educability as a stable quantity, and the prognostic value of tests; variability in results obtained by testing. (b) Application and validation of tests in vocational guidance; test of logical intelligence; character tests; French adaptation of Army Alpha as a measure of general intelligence; reliability of intelligence tests.

III. *Study of Work:* The worker's share in determining output; psychology of conveyor-belt work; electromyography as a method of studying work; fatigue studies; essential problems in the study of trades.

IV. *Problems of Rationalization:* Management as technopsychology; technopsychology and scientific management; the engineer and the technopsychologist; technopsychology in the service of the unemployed; application of technopsychology to the technique of illumination; lighting and conveyor-belt work.

V. *Vocational Selection:* Vocational aptitudes in surgery, orthopedics and dentistry; some guiding principles of vocational selection; technopsychological selection for admission to a conservatory of music; neglected methods in employment psychology.

VI. *Selection in the Transportation Industry:* Psychological tests by motion picture and tachistoscope and their industrial applictions; individual differences in proneness to accidents; general intelligence and special aptitudes of motormen; new psychological tests for aviators, pilots, and locomotive engineers.

VII. *Vocational Guidance:* Search for and diagnosis of vocational aptitudes; character traits; the eidetic type and vocational guidance; vocational guidance in agricultural work; scientific basis of vocational guidance; description of institutes of occupational orientation in Lisbon, Prague, Luxemburg.

VIII. *Technopsychology and Apprenticeship:* Selection and scientific organization of industrial apprenticeship; use of group tests; psychomotor functions, selection of artisan-apprentices.

IX. *Technopsychology and the School:* Comparative value of examinations and tests; measures of intelligence and scholastic accomplishment; technopsychology of sports.

X. *Technopsychology and Mental Hygiene:* Relations of technopsychology and psychiatry; a measure of recuperation of the neuro-muscular system during work; segregation of psychopathic school children; collaboration of technopsychology and mental hygiene clinics; respiratory symptoms of delinquents; lack of social and occupational adaptation as a result of unsuspected psychopathic ailments; vocational guidance of backward children; intelligence and epilepsy; necessity of early diagnosis of mental trouble in motormen; minor symptoms of chronic alcoholism; psychological rating schedule for the examination of the mentally ill.

XI. *Organization of Technopsychology:* Necessity of international coöperation; the International Institute of Scientific Management; accounts of work carried on in Switzerland, Belgium, Russia and Poland.

This array is but a sampling of the subjects presented. Each paper merits analysis, and the entire volume is recommended as a survey of recent work for those who wish to glimpse the breadth of the field of technopsychology.

UNIVERSITY OF IOWA STUDIES IN PSYCHOLOGY, NO. XI

(Psychological Monograph, No. 176, 1928)
Edited by Christian A. Ruckmick. Princeton, N. J.:
Psychological Review Company, 1928

REVIEWED BY ARTHUR HOWARD SUTHERLAND

Among the studies from this laboratory is one by Nancy Bailey, who attempted to secure uniform indications of fear responses by means of a galvanometer applied to the skin. Two types of fear seem to give characteristic responses,—one, the startled fear such as results from a sudden loud sound; the other, an apprehension which arises in the perception of a danger. The skin resistance decreases abruptly when one is startled. The mental evaluation of the possible danger of the stimulus ranges from remote to immediate, and in the latter case grows gradually stronger. This is shown also by gradual deflection of the galvanometer.

Delia L. Larson has subjected the Seashore Consonance Test to an additional critique, applying it to three groups of people, one untrained, a second group of trained subjects, and a third group unselected. She finds the consonance test reliable either as a group or an individual test, provided the instructions are followed carefully and literally. The musically talented tend to possess an outstanding ability to judge consonance, but the author gives warning that a high score on the consonance test is not sufficient to demonstrate the possession of musical ability, since sensitivity to consonance is merely one of the components of musical talent.

A HISTORY OF SOCIALISTIC THOUGHT

By Harry W. Laidler. New York: Thomas Y. Crowell Company, 1927. Pp. 713

Reviewed by James H. S. Bossard

Socialism, like progress and education, is one of the most abused words of the English language. Like evolution and Freudianism, it is a favorite topic in discussions not handicapped by a knowledge of the subject. For that large number of persons who know little, if anything, about Socialism, this book will serve as an excellent introduction; those familiar with the movement will appreciate its service of synthetic interpretation.

From Amos and Hosea to Stroebel and Norman Thomas, this book presents the history of socialistic thought and of the movements for its application. It is a supplementary volume to *Socialism in Thought and Action*, (1920) by the same author, who is executive director of the League for Industrial Democracy.

In seeking to tell the story of Socialism somewhat after the manner of recent "outlines," the author has been signally successful. The expansive sweep of material covered is organized into well-apportioned parts,—approximately one hundred fifty pages is devoted to pre-Marxian Socialism; some sixty pages to Marx; about two hundred twenty-five pages to various schools of Socialism between Marx and the World War; another hundred seventy-five pages to post-war Socialism, and a concluding sixty pages to miscellaneous allied movements.

The book is well written, well documented, with the chief emphasis upon the thought life of the movement rather than its organizational history. The volume is an interpretative history, not a veiled propaganda.

THE CHOICE OF AN OCCUPATION

By Albert Beecher Crawford. New Haven, Conn.: Yale University Press, 1929. Pp. 227

Reviewed by W. H. Cowley

Everybody knows that one of the two or three most important factors in helping college students to vocational adjustment is the accumulation of accurate, intelligible, and well-written information about occupations. Everybody knows, too, that to date very few occupational monographs have been written on the college level and that vocational orientation as a university program has been seriously held up awaiting the appearance of just such a volume as this which Mr. Crawford has written primarily for seniors at Yale.

Mr. Crawford's book contains brief discussions of sixteen types of careers. These include seven of the professions, eight branches of engineering, and detailed discussions of a dozen and a half major divisions of the business field. These discussions vary in length from two to a dozen pages and contain summaries of such factors as preparation required, remuneration, qualifications essential for success. For each field a well balanced bibliography is provided. The book in its introduction contrasts college life with professional and business life; it furnishes general statements concerning salary returns, suggestions telling how to select one's type of activity, what to look for in a job, and a discussion of the functional approach to business. As far as the present reviewer knows, this is the only summary of the sort that has been prepared for college students, and as such is a pioneer piece of work which will have tremendous value for Yale students, and it is hoped, for seniors in other institutions.

It should be said, of course, that Mr. Crawford's volume has some of the limitations of a pioneer text. The discussions of several of the occupations are limited and in need of much more complete development. Unfortunately, too, advantage is not taken of the recent development of the work of the American Council on Education concerning Records of Performance, Business Specifications, and Records of Usage; and significant as are the remarks in the introduction concerning the student's need of readjusting his attitude from the college to the business or professional level, this part of Mr. Crawford's work seems to this reviewer to be rather thin. A great deal needs yet to be done in discovering why many employers are still opposed to college men, and why college men find it difficult to settle down in their first or second job. At this writing I have on my desk before me a copy of a letter from a prominent business man in Chicago who is berating the college graduate and his failure to make good in the large organization. His remarks are so often duplicated by other employers over the country, that it seems to me that Mr. Crawford might have made a more thorough analysis of adjustment problems.

As a pioneer effort, however, the volume as a whole is a piece of work of which the Department of Personnel Study at Yale University may be consciously proud. In the near future it seems certain that college personnel offices will have a large number of carefully written monographs at their disposal, each adequately describing a major field of the world's work. Supplementing such monographs there is great need for a general survey of the various occupations and of the industrial and professional structure of modern society as a whole. Mr. Crawford's book is the first attempt in the direction of providing for this need. Not only will it be effective and immediately useful at Yale, but it should also prove a stimulus to other educational personnel directors to prepare an even more thorough and comprehensive study sometime in the not too distant future.

New Books

PERSONNEL MANAGEMENT

AMERICAN LIBRARY ASSOCIATION'S COMMITTEE ON CLASSIFICATION OF LIBRARY PERSONNEL. *Budget, classification and compensation plans for university and college libraries.* Chicago: Author, 1929. 75 p. $1.15.

GARDINER, GLENN L. *Practical office supervision.* New York: McGraw-Hill Book Co., 1929. 294 p. $3.00.

GIST, ARTHUR S. *Activities of the principal; eighth year book.* Washington, D. C.: National Education Association, 1929. 306 p. $2.00.

HARTLEY, LAWRENCE A. *Human engineering and industrial economy.* Chicago: Author, (c/o Marshall Jackson Co., 26 S. Clark Street) 1928. 367 p. Apply.

MCNIESE, JESSIE S., ED. *The library and its workers.* New York: H. W. Wilson Co., 1929. 422 p. $2.75.

SCOTT, HARRY A. *Personnel study of directors of physical education for men, in colleges and universities.* New York: Bureau of Publications, Teachers College. 1929. 90 p. $1.50.

INDUSTRIAL AND LABOR RELATIONS

American Labor Year Book, 1928. New York: Rand School of Social Sciences, 1929. 302 p. $2.50.

CLAY, HENRY. *The problem of industrial relations and other lectures.* New York: The Macmillan Co., 1929. 330 p. $4.50.

GEMMILL, PAUL F. *Present day labor relations.* New York: John Wiley and Sons, 1929. 312 p. $3.00.

The Inquiry. *Business and ideals, a syllabus of discussion outlines for groups of business employees.* New York: Author, 1929. 96 p. $1.25.

Lorwin, Lewis L. *Labor and internationalism.* New York: The Macmillan Co., 1929. 700 p. $3.00.

VOCATIONAL INFORMATION AND VOCATIONAL GUIDANCE

Cave, Edna Selena. *Craft Work.* New York: Century Co., 1929. 291 p. $3.00.

Pulp and Paper Industry of the United States and Canada, Joint Committee on Education. *Manufacture of pulp and paper.* New York: McGraw-Hill Book Co., 1929. 739 p. $6.00.

Trumbull, Frederick M. (Edited by J. C. Wright.) *Guidance and education of prospective junior wage earners.* New York: John Wiley and Sons, 1929. 278 p. $3.00.

EDUCATION

American Library Association. *Sixty Educational Books of 1928.* Chicago: Author, 1929. 4 p. 15¢.

Bennett, Guy Vernon. *Vocational education of junior college grade.* Baltimore: Warwick and York, 1928. 244 p. 2.75.

Blake, Mabell Babcock, and others. *The education of the modern girl.* Boston: Houghton, Mifflin Co., 1929. $3.00.

Bliss, Henry Evenly. (Introduction by John Dewey.) *The organization of knowledge and the system of the sciences.* New York: Henry Holt & Co., 1929. 453 p. $5.00.

Brown, Maud A. *Teaching health in Fargo.* New York: Commonwealth Fund, Division of Publications, 578 Madison Avenue, 1929. 156 p. $1.50.

Morris, Elizabeth Hunt. *Personal traits and success in teaching.* New York: Bureau of Publications, Teachers College, 1929. 75 p. $1.50.

National Safety Council. *Safety education in the rural school.* New York: Author, (One Park Avenue), 1929. 38 p. 25¢.

Reed, Alfred Z. *Review of legal education in the United States and Canada for the year 1928.* New York: Carnegie Fund for the Advancement of Teaching, (522 Fifth Avenue) 1929, 51 p. Gratis.

Shepardson, Whitney H. *Agricultural education in the United States.* New York: The Macmillan Co., 1929. 140 p. $1.50.

Thorndike, Edward Lee and Gates, Arthur I. *Elementary principles of education.* New York: The Macmillan Co., 1929. 345 p. $1.60.

SOCIOLOGY

Babcock, Donald C. *Man and social achievement; an introduction to social evolution.* New York: Longmans, Green and Co., 1929. 230 p. $3.00.

Lundberg, George A. *Social research: a study in methods of gathering data.* New York: Longmans, Green & Co., 1929. 391 p. $3.00.

Park, Robert E., and others. *Research in the Social Sciences.* New York: The Macmillan Co., 1929. 315 p. $2.00.

ECONOMICS

Adams, Thomas, and others. *Population, land values and government.* New York: Regional Plan of New York, (130 East 22d Street), 1929. 320 p. $3.00.

Committee on Recent Economic Changes of the President's Conference on Unemployment. *Recent economic changes in the United States.* Washington, D. C.: Superintendent of Documents, 1929. 36 p. 5¢.

Committee on Recent Economic Changes of the President's Conference on Unemployment. *Recent economic changes in the United States.* New York: McGraw-Hill Book Co., 2 v. 955 p. $7.50.

Hall, Lincoln W., and Hall, R. Leigh. *An approach to definite forecasting.* Philadelphia: University of Pennsylvania Press, 1929. 151 p. $3.00.

Harvard Business reports. New York: McGraw-Hill Book Company, 1928. 544 p. $7.50.

PSYCHOLOGY

BROWN, WILLIAM. *Science and personality.* New Haven, Conn.: Yale University Press. 266 p. $3.00.

BURGESS, ERNEST WATSON. *Personality and the social group.* Chicago: University of Chicago Press, 1929. 242 p. $3.00.

BURTT, EDWIN ARTHUR. *Principles and problems of right thinking.* New York: Harper & Bros., 1928. 508 p. $3.50.

DOWNEY, JUNE E. *Creative imagination: studies in the psychology of literature.* New York: Harcourt, Brace and Co., 1929. 238 p. $3.75.

HAGUE, ELIZABETH FERN AND OTHERS. *Studies in conduct; with character case conferences.* Book 3. Lincoln, Neb.: University Publishing Co., 1929. $1.08

HINGSTON, R. W. G. (Introduction by Bertrand Russell.) *Interest and Intelligence* (American Edition.) New York: The Macmillan Co., 1929. 311 p. $2.50.

JACOBSON, EDMUND, M.D. *Progressive relaxation: a physiological and clinical investigation of muscular states and their significance in psychology and medical practice.* Chicago: University of Chicago Press, 1929. 441 p. $5.00.

MCCARTY, DWIGHT G. *Psychology for lawyers.* New York: Prentice-Hall, Inc., 1929. 723 p. $6.00.

MOSS, FRED AUGUST. *Applications of psychology.* Boston: Houghton Mifflin Co., 1929. 487 p. $3.00.

ODELL, CHARLES WATTERS. *Critical study of measures of achievement relative to capacity.* Urbana, Ill.: University of Illinois, 1929. 58 p. 50¢.

PILLSBURY, WALTER BOWERS. *The history of psychology.* New York: W. W. Norton, 1929. 326 p. $3.50.

SCHNEERSOHN, F. M.D. (Translated by Herman Frankj; forewords by Adolf Meyer and John Dewey.) *Studies in psycho-expedition; fundamentals of the psychological science of man and a theory of nervousness.* New York: N. L. Brown, 1929. 222 p. $3.50.

VALENTINE, CHARLES WILFRID. *The new psychology of the unconscious.* New York: The Macmillan Co., 1929. 162 p. $1.60.

WECHSLER, ISRAEL S. *The neuroses.* Philadelphia: W. B. Saunders Co., 1929. 330 p. $4.00.

Current Periodicals

PREPARED BY LINDA H. MORLEY, *Industrial Relations Counselors, Inc.*

AGE—RELIEF MEASURES

AMERICAN ASSOCIATION FOR LABOR LEGISLATION. Non-institutional aged poor. *American Labor Legislation Review,* June 1929, Vol. 19, 193–224.

Report on aged dependents cared for outside of institutions by private agencies in New York City. This study was jointly financed by the American Association for Labor Legislation, the Fraternal Order of Eagles and the Welfare Council of New York City.

BUDGETS

SCHWEINITZ, KARL DE. Are the poor really poor? *Survey,* January 15, 1929, Vol. 59, 517–519

Actual budget figures in Philadelphia; result of survey in 1925.

COLLEGE MEN IN BUSINESS

BOWEN, W. C. (Personnel Director, International Telephone and Telegraph Co.) Harvesting the college crop. *Nation's Business,* June 1929, Vol. 17, 100, 102, 103.

Methods of selecting college graduates for work in the International Telephone and Telegraph Co.

COÖPERATION

PARLETTE, RALPH. Keeping Main Street on the map. *Nation's Business,* May 1929, Vol. 17, 89–90, 94, 95, 96, 97.

Kingsport, Tennessee, a coöperative town, described.

COST OF LIVING

Recent changes in the cost of living. *News-Bulletin of the National Bureau of Eco-*

nomic Research, Inc., June 10, 1929, No. 32, 1–3.

Prices of goods consumed by all classes moved very slightly in 1928. Study covers the period 1909–1928.

ECONOMIC CONDITIONS

KLEIN, JULIUS. World economic position—ten years after the war. *Magazine of Wall Street*, November 3, 1928, Vol. 43, 10–13, 86–91. (Abstract in *Social Science Abstracts*, June 1929, Vol. 1, 476).

Changes that have been wrought in the status of manufacturing, mining and agriculture.

FATIGUE

SAWYER, WILLIAM ALFRED, M.D. (Medical Director, Eastman Kodak Company.) Practical considerations of fatigue. *Society of Industrial Engineers Bulletin*, March 1929, Vol. 11, 11–16, 24.

Working conditions; lighting; air; posture; noise; supervision.

HEALTH—COSTS

CARPENTER, NILES. Social costs of illness. *American Labor Legislation Review*, June 1929, Vol. 19, 155–162.

Outline of the study now under way by the Committee on the Cost of Medical Care, written by its Assistant Director of Study.

INCENTIVES—OFFICE WORK

ILLINOIS MANUFACTURERS ASSOCIATION. Wage incentive plans for office employees. *National Association of Office Managers Bulletin*, February 1929, Vol. 4, 10–12. (Abstract in *Management Review* May 1929, Vol. 18, 158).

INDUSTRIAL RELATIONS

SLICHTER, S. H. Current labor policies of American industries. *Quarterly Journal of Economics*, May 1929, Vol. 43, 393–435.

TELFORD, FRED (Bureau of Public Personnel Administration) Personnel standards in public welfare work. *Social Service Review*, March 1929, Vol. 3, 50–57.

YOUNG, ARTHUR H. (Industrial Relations Counselors, Inc.) Field of industrial relations. *Service Letter on Industrial Relations*, May 5, 1929, No. 33, 1–4.

LABOR

FRIEDLANDER, L. M. Labour problems in two worlds. *Economics*, April 1929, No. 25, 4–14.

LEADERSHIP

CRAIG, DAVID R. Training office workers in leadership. *National Association of Office Managers Bulletin*, February 1929, Vol. 4, 4–5. (Abstract in *Management Review*, May 1929, Vol. 18, 158).

MACHINERY IN INDUSTRY

COWDRICK, EDWARD S. Labor explores new fields. *Nation's Business*, March 1929, Vol. 17, 27–28, 191, 192, 194.

Placing the worn out worker. Transference of workers as they become older.

MINIMUM WAGE

DOUGLAS, PAUL H. Minimum wage and family allowances. *World Tomorrow*, December 1928, Vol. 11, 495–498. (Abstract in *Social Science Abstracts*, June 1929, Vol. 1, 497.)

Gives instances of this method of wage payment in the Columbia Conserve Company and Ludens Company, and in the payment of faculty salaries by Wells College and Bennington College.

OCCUPATIONS

RETAIL CREDIT COMPANY. Tobacco products. *Industry Report*, June, 1929, Vol. 4, 1–9.

Includes: Classification of jobs, and potential health hazards associated with tobacco products.

RETAIL CREDIT COMPANY. Turpentine. *Industry Report*, May 1929, Vol. 4, 1–6.

Includes: Classification of jobs, and potential health hazards associated with turpentine.

PENSIONS

Final results of legislative activities. *Bulletin of the American Association for Old Age Security*, June–July 1929, Vol. 3, 4.

Group pension schemes. *Economist*, May 18, 1929, Vol. 108, 1100–1101.

Criticism of American plans.

PROFIT SHARING

Balderston, C. C. (Assistant Professor of Industry, University of Pennsylvania.) Profit-sharing an incentive plan for executives. *Factory and Industrial Management*, May 1929, Vol. 77, 968–970.

RESEARCH

Green, J. B. (President, Fusion Welding Corporation, Chicago.) From hunches common, to research preferred. *Factory and Industrial Management*, June 1929, Vol. 77, 1225–1228.

"The principles for the conduct of research which I have tried to describe, are fundamental and general. I should follow them if I were interested in marketing neckties or dill pickles. They are the principles by which any business, which has worth-while questions to ask, should go about finding the answer."

SAFETY

Beresford, A. W. Safety and production. *Manufacturers' News*, May 1929, 32–33.

Smith, C. D. Accident proneness: results of a study of accident proneness among employees of the Cleveland Railway Company. *Electric Traction*, May 1929, Vol. 25, 229–231.

SELECTION OF EMPLOYEES

Hull, H. Hayden (Consulting Personnel Engineer, Brooklyn, N. Y.). Technique in employment for sub-executive positions. *Bulletin of the Taylor Society*, April 1929, Vol. 14, 71–85.

Method of measuring personality factors in an individual and comparing them with job requirements.

SKILL

Renold, C. C. Present position of skill in industry. *Economic Journal*, December 1928, Vol. 38, 593–604. (Abstract in *Social Science Abstracts*, June 1929, Vol. 1, 492.)

Illustrated by statistics of skill in the Works of Hans Renold.

STRIKES

Southern textiles. *American Federationist*, June 1929, Vol. 36, 664–706.

Cover title as above. Contents: "Story of the Elizabethton strike," Margaret Bowen; "Conciliation proposals," Edward McGrady; "Organization possibilities in South Carolina," Dowell Patterson; "Few words on organization," Paul J. Aymon; "Strategic opportunity in North Carolina," T. A. Wilson; "Union progress in South Carolina," George L. Googe; "Organizing opportunities in North Carolina," John A. Peel; "Present situation in textiles," Ethelbert Stewart; "Textiles as a community problem," William Smith; "Women workers in textiles," Mary Anderson; "Taxation tyranny," Harold P. Marley; "Living trust for industry," Charles Newton Hulvey and William H. Wandel.

TRAINING—APPRENTICES

Alexander, M. W. Apprentice training in industry should be revived. *Manufacturers' News*, May 1929, 37–38.

Tripp, Charles K. Apprentice system at Lynn plant, G. E. Co. *Mechanical Engineering*, April 1929, Vol. 51, 285–286. (Abstract in *Management Review*, May 1929, Vol. 18, 165.)

TRAINING—RETAIL TRADE

Watkins, C. M. Superior service; how it meets the competition of cut prices in a city of drug chains. *Chain Store Age*, May 1929, 41–43.

Training employees.

UNEMPLOYMENT

Clay, Henry. Unemployment and wage rates. *Economic Journal*, March 1928, Vol. 38, 1–15.

WAGES

Frain, H. LaR. Relation between normal working time and hourly and weekly earnings. *Quarterly Journal of Economics*, May 1929, Vol. 43, 544–550.

WOMEN

PERSONNEL CLUB OF NEW YORK. Round table meeting, March 26th: The older woman in industry. *News Letter*, May 20 1929, Vol. 5, 4–5.

Abstract of statements by six personnel workers.

Woman in the modern world. *Annals of the American Academy*, May 1929, Vol. 143, 1–373.

In seven parts: The genesis and significance of the woman movement; Woman's contribution to the modern home; Women's work outside the home, in industry; Women in business and the professions; Some achievements of women as creative citizens; Social attitudes affecting women's work; Integration of women's activities.

Women in business and the professions. *Annals of the American Academy*, June 1929, Vol. 143, 132–194.

Contents: "Economic problems of women," E. J. Hutchinson; "Some factors affecting the earnings of business and professional women," Margaret Elliott and G. E. Manson; "Women as college teachers," M. O. Hawthorne; "Position of women in the public schools," by Charl Williams; "Women in odd and unusual fields of work," M. S. Leuck; "Women in the clerical occupations," G. D. Coyle; "Women in farm life and rural economy," M. M. Atkinson.

Social attitudes affecting women's work. *Annals of the American Academy*, June 1929, Vol. 143, 255–300.

Contents: "Legal and administrative restrictions affecting the rights of married women to work," M. P. Smith; "At the crossroads in the legal protection of women in industry," E. F. Baker; "Effects of labor legislation on women's work," M. N. Winslow; "Labor legislation for women and its effects on earnings and conditions of labor," Florence Kelley.

Women's work outside the home, in industry. *Annals of the American Academy*, June 1929, Vol. 143, 61–131.

Contents: "Efficiency of women workers," Lillian M. Gilbreth; "Occupations and earnings of women in industry," A. R. Hager; "What the wage-earning woman contributes to family support," A. L. Peterson; "Ohio's women workers," A. G. Maher; "Trend in women's wages," Nelle Schwartz; "Labor turnover of working women," M. B. Benson; "Trade union activities of women," Theresa Wolfson

Boredom in Industry

By S. Wyatt, *London*

In the great factories of Manchester and other industrial centers of England, Mr. Wyatt as an investigator for the Industrial Fatigue Research Board has for several years been engaged in studying repetitive work. Here he summarizes what he has learned about one of the major problems of industrial psychology growing out of extreme specialization and subdivision of labor; namely, the problem of boredom: its incidence, extent, causes and remedies.

This paper summarizes the results of experimental enquiries into the nature and causes of boredom and suggests remedies for it in the case of factory machine operators engaged in repetitive work. Individual differences determine in large measure the degree of boredom experienced. The existence of noted variations in intelligence, temperamental tendencies, and ability to mechanize a task provides important problems for future research. Not all workers are subject to boredom but after two hours at the same task most operators become restless and continue work with effort or reduced efficiency. Boredom is experienced less in the afternoon than in the morning. The mechanisms underlying boredom appear to be illuminated by a temporal illusion noted in bored workers: time elapsed is overestimated. The nature of the task contributes to boredom: operations involving attention and adjustment in response to varied situations are in general less boring than those requiring only intermittent or partial attention; while tasks so automatized as to permit uninterupted mind wandering seem to produce—in workers temperamentally suited to repetitive work—a minimum of boredom,—which suggests a means for its avoidance. Keeping pace with a rhythmically operating machine; teaching the operator the importance of the work he is doing; supplying material in small lots rather in an endless flow along a belt; improving working conditions, both for the prevention of unpleasant day-dreams about the job and for the development of pride in the organization and satisfaction in the job are all indicated remedies for the dissipation of boredom. Facilities for developing a richer life outside the factory will be provided by employers interested in the development of the worker as a citizen.

BOREDOM is frequently though by no means always experienced by individuals engaged in repetitive work. The occasional visitor to a factory is apt to think that all repetitive processes are monotonous, and tends to regard the operatives with mingled feelings of pity and admiration. A longer and more detailed examination of the conditions of work, however, begins to reveal variety in the midst of apparent uniformity, and conversation with the operatives often discloses a totally unexpected attitude towards the industrial process. As Münsterberg remarks, "The shepherd knows every sheep, though the passer-by has the impression that they all look alike," and a similar discriminative process seems to occur in connection with the operative and her work.

INFLUENCES PRODUCING BOREDOM

Although the experience of boredom may be less intense than the outsider generally imagines, its existence in some workers is undoubtedly very marked, and the effect on productive activity quite pronounced. Most operatives engaged on repetitive work are apparently able to maintain a satisfactory rate of working during the first two hours of the spell, but then signs of restlessness and a desire for change often begin to appear. The continued performance of the task seems to become increasingly difficult, and efficiency is maintained only at the expense of increased effort. Conversely, if this increased effort is not forthcoming, efficiency suffers. Frequently, however, a compromise between these two conflicting tendencies is effected, and the rate of working is then characterised by alternating phases of effort and relaxation, resulting in a reduction in the average rate of working together with increased variability. The feeling of disagreeableness, or boredom, experienced under such conditions appears to be conditioned by the increasing difficulty of the performance, due to the inhibiting effect of uniformly repeated movements and the increased effort involved in maintaining activity in the face of intruding inclinations.

Operatives frequently work better in the afternoon than in the morning, and their statements indicate that the lower morning output is probably due to the increased effects of boredom in that spell. When activities provide little or no interest, the prospects are depressing and discouraging, and the effect seems to bear some relation to the magnitude of the task to be accomplished. To a person who dislikes walking, the prospects of a twenty mile tramp over uninteresting country may be almost painful, and although he starts with a certain amount of forced effort and enthusiasm, this soon disappears and leaves him in a darkened mood. At this stage the magnitude of the task may seem appalling, but as the time for lunch and rest draws near interest is awakened and depression recedes. The distance still to be traversed now shrinks considerably, and bears little resemblance to the endless trail conceived a few hours before. A new swing and liveliness characterise his step as he again takes to the road, and although these may diminish after a few more miles, they reappear with increased intensity as he enters the lap which separates him from his goal.

A somewhat similar outlook confronts the repetitive worker employed on a comparatively uninteresting process. Enthusiasm and interest are usually at a minimum towards the middle of the morning spell. They are revived by the expected and actual recuperative effects of the mid-day break, and the diminishing magnitude of the task as the end of the afternoon is approached.

MECHANISM UNDERLYING BOREDOM

The increased variability in the rate of working which is frequently observed about the middle of the spell when boredom is experienced suggests that under such conditions the mechanism concerned with the initiation and control of movement becomes impaired, and while the natural tendency is for the rate of working to be reduced, spasmodic outbursts of energy sometimes bring about the attainment of unusually high speeds. The results obtained under such conditions seem, in fact, to represent the resultant of a conflict between natural desires and volitional effort; sometimes the one, sometimes the other gaining the upper hand. A continuation of this state would, of course, be very fatiguing, but the return of a more favorable attitude, induced by consciousness of the approaching end of work, reduces boredom and facilitates activity. Hence the rate of working often becomes less variable towards the end of the spell, which again is an indication of the transitory effects of boredom experienced earlier in the period of work and evidence of the absence of any appreciable degree of fatigue.

The bored individual is also inclined to over-estimate the duration of time, and this tendency seems to throw some light on the mechanism underlying boredom. A number of laboratory experiments have been conducted on the estimated duration of time-intervals, and it has been found that the results are affected by the number and nature of the experiences they contain. Earlier experiments showed that when a subject is occupied for a short period, the duration of that period almost always appeared to be shorter than a similar interval idly spent. With a longer interval, however, the temporal illusion was said to diminish and to be reversed when the intervals extended beyond a certain point. More recent experiments[1] have shown that the estimation of time-intervals is determined by the amount of mental content experienced during the period and may be independent of the activity performed. Confusion has arisen because investigators have failed to distinguish between external events and subjective experiences. It is possible, for instance, for the industrial worker to be fully occupied in manipulative activity while her thoughts may be either desultory or lively. The estimated duration of time will accordingly be very different in the two cases, since it depends upon the nature of the thought process rather than on external events. Usually, of course, the content of thought is conditioned by the perception of external situations, but the former is not necessarily determined by the latter. Waiting to be treated by the dentist may seem almost interminable, but during that time the mind is usually imaginatively engaged, and filled with more than the average number of thoughts. Had the waiting patient been able to expel all thought and make his mind a blank, time would have seemed surprizingly short because of the absence of anything to mark its passage. Benussi[2] seems to be near the truth when he states that a time-interval appears long when the attention of the subject is drawn towards it, and short when attention is drawn away from it. Operatives sometimes give very little attention to their work and are constantly looking at the clock, with the result that time seems to pass with unusual slowness. When, on the other hand, difficult conditions absorb the attention, they are often surprised at the accelerated passage of time.

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[1] See, for instance, *The Psychology of Time*, Mary Sturt, London, 1925; and *Allgemeine sinnesphysiologie*, V. Kries, Leipzig. 1923.

When an activity is accompanied by interest, attention is spontaneous and the conative process functions smoothly and continuously. The thought processes constitute parts of a unified whole and the individual is not consciously aware of the associated components. Time in consequence appears to pass comparatively quickly because of the uninterrupted flow of mental activity towards the desired goal.

In repetitive processes devoid of interest there seems to be an absence of any definite conation unless it is the longing for the signal which denotes the end of the industrial day. As a result the mind of the repetitive worker is often filled with a number of varied and discordant thoughts, and attention is constantly directed to the amount of time still to be worked. Time seems to be measured by the awareness or the number of thoughts passing through the mind within a given period, and as these are both numerous and disconnected, the day appears to be supercharged with ideas and its duration in consequence overestimated.

FACTORS IN WORK PRODUCING OR ALLEVIATING BOREDOM

Although the experience of boredom appears to be largely dependent upon personal characteristics and tendencies, it is also related to the type of occupational activity. A general comparison is frequently made between the days of craft-skill and modern repetitive tendencies. Formerly the bootmaker, for instance, was responsible for the production of the complete article. Often he was acquainted with the person who bought and wore the boots, and his interest in them was revived when they were brought to be repaired. He was supposed to take pride in the product of his skill, and the completion of each article was the satisfying outcome of his constructive effort. Nowadays the employee in a boot and shoe factory is usually concerned with the repeated production of a single part, and has no personal interest in the final product or its destination.

There is little doubt that the varying nature of the work, with its appeal to the constructive instinct and resulting pleasure in achievement, associated with the days of craft skill, were much less conducive to boredom than the repetitive processes of modern industry. The latter, however, sometimes contain elements which are unfavorable to the development of boredom. Thus operations involving attention and adjustment in response to varied situations are generally less boring than those which make only intermittent and partial appeals to mental activity. In the former case the mind is actively and sometimes interestedly engaged; conative tendencies are constantly aroused in response to unexpected situations, and present obstacles to the intrusion of incompatible tendencies. In the latter the mind is frequently disturbed by elements in the industrial situation, but remains comparatively unoccupied during the intervening periods. At such times thought is free to dwell upon such distressing matters as the length of time still to be endured, and boredom is liable to supervene. Mind-wandering may, of course, provide a certain amount of relief, but the frequent interruptions make the process very discontinuous. Providing the mind can be actively engaged, whether in connection with the industrial process, or in activities entirely dissociated from the conditions of work, boredom is not likely to arise with any degree of intensity.

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[2] V. Benussi, *Psychologie der Zeitauffassung*, Heidelberg, 1913, p. 456.

Another antidote to boredom is the mild excitement and interest created by attempting to keep pace with machines running at a fixed speed. Provided this tempo is suitably adapted to the natural rate of working of the operative, it frequently acts as an incentive to activity when the tendency of the operative is to relax, and the rhythmical movements promote a pleasant emotional effect.

The additional incentive and satisfaction which accompanies a piece-rate system of payment also tend to retard the onset of boredom. There is little doubt that when the rate of payment is based upon the amount produced, the operative is dimly aware that each unit of output has its equivalent in the amount received at the end of the week, and consequently the activities acquire a derived interest which is absent from a time-rate system of payment. As a result boredom tends to be more prevalent when the operatives are paid according to time worked and is diminished by the additional interest and satisfaction associated with a piece-rate system of payment. A somewhat similar view has been expressed by a German writer,[3] who stated that boredom is influenced by the system of wage-payment, and concluded that a time-rate was more conducive to boredom than a piece-rate.

The experience of boredom is also dependent to a certain extent upon the method by which material is supplied to the operatives. Quantities which take about an hour to complete give much more satisfaction than an endless flow along a conveyer, because of the interest and pleasure associated with consciousness of achievement. Anyone who has been confronted with the task of turning-over half-an-acre of ground will be familiar with the overwhelming nature of the outlook. If, however, he deludes himself that the area is really composed of smaller parts and sets himself to complete one of these instead of the larger whole, the disagreeable features shrink to small proportions, interest is revived, and work proceeds with a swing. A somewhat similar situation confronts the person who is condemned to memorize a long poem. Although certain psychological

[3] H. Sachs, "Das Monotonieproblem," *Zeits, f. ang. Psychol.*, Vol. XVI, 1920, p. 71.

considerations suggest the "whole" method of learning rather than the "part," there is little doubt that the latter is more interesting than the former because of the smaller magnitude of each successive task and the satisfaction arising from each sectional achievement. In industry also, the completion of each batch of supplies, whether it be three gross of tins to be sealed, two dozen handkerchiefs to be folded, or four dozen filaments to be wound, is regarded by the operative as a self-contained task within the larger whole. Instead of developing symptoms of an inferiority complex she feels she is well "on top" of the job, experiences satisfaction as each batch is approaching completion, and is pleasantly relieved when the end is actually attained. No such variations fall to the lot of the conveyer worker, who is carried along by the never ending stream of supplies.

The length of time during which a repetitive form of activity can be endured with a certain amount of satisfaction seems to have its root in the evolutionary process. As Bücher remarks,[4] "children and primitive people seldom persevere with an occupation, and they tire of it more or less quickly as it demands greater or less concentrated attention and continuous exertion. This is not because they are incapable of standing bodily fatigue, but that they are incapable of continuous mental effort which involves inhibition of other activities and consequently a special fatigue."

Although adult operatives differ from the type of individual specifically mentioned by Bücher, their desire for change in the form of activity, or for the division of work into a number of circumscribed tasks, is comparable to that of children or primitive peoples. In some operatives it is more intense than in others. Hence, whenever possible, it is advisable to break up the supply of industrial material into units which evoke a series of conative tendencies with their accompanying interest and satisfaction.

DIFFERENCES IN INTELLIGENCE, HABITS AND TEMPERAMENT

Apart from the effect of variations in the objective conditions of work, individual differences in response to similar situations are also instrumental in determining the degree of boredom experienced. Clearly an important problem for future research is the determination of the personal characteristics which make the worker peculiarly susceptible to boredom, to be followed by the construction and application of suitable diagnostic tests for guidance purposes. The path to be pursued has been faintly indicated by some of the results obtained in a recent enquiry.

In the first place, it has been shown that workers endowed with a comparatively high degree of general intelligence tend to be bored by repetitive conditions of work, while those with a much lower order of intelligence are generally more satisfied with uniformly repeated activity. If further research corroborates this view, an important advance will have been made.

Secondly, some individuals seemed to suffer from boredom because they were unable to indulge with freedom in such remedial measures as mind-wandering or conversation, unless, at the same time, productive efficiency was appreciably impaired. Individual differences in ability to mechanize the task were appreciable, and those who are successful in this respect not only conserve energy by relegating performance to the lower levels of the nervous system, but are also in a better position to enjoy any personal or social amenities associated with the conditions of work. A man may swing his legs thousands of times in the course of a twenty mile walk, and conversation with a pleasant companion would not impair progress, but act as an antidote to boredom. If, however, he had to concentrate attention on every step, exhaustion would quickly supervene.

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[4] Bücher, *Arbeit und Rhythmus*, Leipzig, 1896.

Thirdly, it is highly probable that the degree of boredom experienced by individuals employed on repetition work may be conditioned by temperamental tendencies. These tendencies, which appear to be inherited, are responsible for many varied forms of behavior, and determine whether a person shall be active or reflective, excitable or phlegmatic, stable or unstable. An individual who is temperamentally lively and mercurial will probably be unsuitable for repetitive work, while one who is patient and submissive may be better adapted to such conditions. Since temperamental tendencies are believed to be almost as deep-seated and persistent as the instincts, and to be intimately connected with occupational success,[5] their investigation appears to be one of the most important problems for future research.

SUGGESTED REMEDIES

Rest Periods

Since the natural inclination of the bored industrial operative is to discontinue the unpleasant activity, rest would appear to be the most obvious remedy in such cases. This possibility has already received recognition in some industrial establishments, and the value of a pause as a means of alleviating the effects of boredom has also been the subject of special enquiry.[6] There is not the least doubt that a rest of ten minutes duration, introduced about the middle of the work-spell, tends to neutralize the unpleasant and unfavorable effects of repeated activity, and is capable of producing an increase in output varying from 2 to 10 per cent.

Equally efficacious in this respect is a change in the form of activity. Just as the apparently fatigued muscle may be induced to resume activity by changing the weight it lifts, so the impaired activity of the repetitive worker may be improved by changing the conditions of work.

In many industrial processes the workers have to return finished work and procure supplies and, providing the excursions involved in this procedure occur at suitable times, they are very effective in supplying the necessary change in position and activity. Even more beneficial are the situations which provide a complete change in the form of activity about half-way through the spell of work. The results of numerous investigations have shown that a change of occupation every two hours or so throughout the day reduces boredom and has a beneficial effect on output. There are many industrial processes in which this procedure is possible, and the question has been fully discussed elsewhere.

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[5] See, for instance, "Temperament and Social Status," by F. C. Bartlett, *Journal of the National Inst. of Industrial Psychology*, Vol. 3, No. 8, p. 401.

[6] Reports Nos. 25 and 32 of the Industrial Fatigue Research Board.

Short Pauses for Conversation

In addition to these remedial measures, the results of the present enquiry show that workers often unwittingly resort to various devices for the purposes of neutralising the effects of boredom. Of these, perhaps the most noticeable is conversation with other operatives. This procedure is a natural and effective antidote to boredom, since it diverts attention from the unpleasant aspects of work and provides an interesting outlet for the expression of personal desires and inclinations. Talking is particularly prominent where the workers form a compact social group, and although it impairs the rate of working whenever attention is necessary to efficient performance, it is probable that output would be still further reduced if talking were prohibited and boredom in consequence allowed to reign supreme. In this connection it is interesting to speculate upon the possible effect of introducing a few short rests within the spell of work during which the workers could let off conversational "steam." By this means conversational tendencies might possibly coalesce, and talking to the accompaniment of work thereby reduced to a minimum. Since talking requires an audience, it follows that the isolated worker will usually be unable to indulge in conversation and consequently will be denied its ameliorating effects. As a result, one would expect to find boredom more pronounced in the case of isolated workers, and statements made by the operatives support this view.

Conditioning Day-dreams and Reveries

Another prominent tendency of repetitive workers is their indulgence in reveries or mind-wandering whenever opportunity permits. Day-dreaming appears to compensate for the deficiencies of life in general and industrial conditions in particular. The worker who is able to day-dream becomes oblivious to unpleasant realities and remains comparatively undisturbed by the unsatisfying features of repetitive work. She is able to exist happily in a world of her own creation, unless, of course, depressing moods determine the content of thought. Situations of the latter type, although probably in a minority, do occasionally exist, and are sometimes conditioned by grievances arising from the conditions of work. The grievance may initially be of minor significance, but uncontrolled rumination is often favorable to its growth, with the result that it eventually finds expression in serious industrial unrest. The creation of a healthy industrial atmosphere is particularly important in this respect. It not only prevents the development of undesirable thoughts, but often sterilizes them at their source.

The extent to which thought can be detached from work will depend upon the nature of the task and the characteristics of the individual. Obviously the more repetitive and uniform the process, the more automatically will it tend to be performed. When activities become habitual, the mind is free to pursue its own inclinations and the conditions are conducive to mind-wandering or phantasy formations. Simple and uniformly repeated operations are, however, by no means the only processes which may be performed with a minimum of attention. Driving a car in city traffic or even the performance of a Beethoven Sonata may, under certain advanced conditions of achievement, become almost habitual, and thought is left free to dwell on other things. Obviously a simple repetitive process will be more easily automatized than a more complex operation, consequently many industrial conditions appear to be particularly favorable to mind-wandering.

As a general rule, boredom seems to be experienced when the attention of the operative is not entirely required by the industrial task, and yet at the same time she is unable to detach her thoughts from the industrial situation. In this respect individuals differ considerably, for while some gifted persons are able to perform two or three operations simultaneously, others are disturbed whenever their thoughts are diverted to subjects having no connection with the work in hand. In short, the more the mind is occupied, whether it be in the process of production or in the more detached operation of mind-wandering, the less likely is boredom to be experienced.

It is generally believed that mind-wandering or day-dreaming is particularly prevalent in the introvert type of person, while the extrovert seldom or never falls into such a state. Further investigation may show that the experience of boredom may be rare in the introvert because of his tendency to seek refuge in day-dreams, while the extrovert, full of activity and interest in external situations, may find repetitive conditions unsatisfying and tedious.

Since, therefore, day-dreaming may be pleasant means of escape from the monotonous conditions of work, and in many cases satisfies personal cravings, it cannot be wholly condemned, but must be accepted as a frequent and possibly beneficial derivative of repetitive work.

At the same time, it must be remembered psycho-analytic enquiries have shown that reveries, like dreams, may contain unpleasant memories of past emotional experiences. Grievances, anxieties, worries, and fears are notoriously persistent, and emerge into consciousness whenever the 'censorship' is relaxed. Recurrent experiences of this type uncritically received sometimes assume grossly exaggerated proportions, and become the dominant determinant of behavior. The individual fails to distinguish between imagined and real situations, and in extreme cases the imagined plan may be carried into execution. There is, as yet, no evidence that the day-dreams of industrial operatives lead to such abnormal states.

Making the Work Interesting

All the remedial measures such as rest-pauses and changes in activity, together with alleviating tendencies like talking and mind-wandering, would be practically unnecessary as a means of combating boredom if work were interesting. Interest is the greatest enemy to boredom, and although repetitive work can never possess the inherent interest of skilled craftsmanship, much might be done to improve industrial conditions in this respect.

In the first place, although the task may appear to be the monotonous repetition of simple movements, boredom need not be unduly pronounced if the operater feels that the work is worth while. Knowledge frequently creates and extends interest, and instruction regarding the preparation, production, distribution, and use of industrial commodities would create new and varied points of contact between the operator and her work. Thought would be promoted along wholesome lines and much of the stagnancy of 'unfilled time' thereby removed.

Improving the Industrial Atmosphere

Since boredom is conditioned not only by the type of industrial process, but also by the entire industrial atmosphere, it is important that the latter should be beyond reproach. In regiments, universities, schools, and similar institutions, traditions and standards of achievement are set up and feelings of pride engendered among the various members. A definite attitude of mind or sentiment is created in connection with the institution, which makes individual members very consciously aware of their position in relation to the organization. The behavior of the individual is largely determined by the nature of the prevailing sentiment or group consciousness; and habits of action and thought are inculcated which conform to the traditions of the institution and meet with the approval of the community.

In certain factories and workshops a similar group consciousness exists which is capable of further development. In a particular mill in the cotton industry, for instance, the operatives are proud of the reputation enjoyed by the firm, and endeavor to preserve it by turning out work of exceptional quality. To work for this firm has become the desire of all the operatives in its locality, with the result that the firm is staffed with contented and enthusiastic workers.

This desirable sentiment can be fostered and developed by promoting and extending the social life of the operatives. Games are particularly useful in this connection, and the formation of football or hockey teams which take part in inter-works competitions develops the consciousness of belonging to a particular firm. Thus Smith's operatives become more distinctly Smith's when opposed to the workers of another firm, and to play and work for Smith's becomes an integral part of their conscious life. A thoughtful and humane employer can be most instrumental in promoting this sentiment, for the interest he takes in the work, play, and general welfare of his operatives will be reciprocated, and a harmonious and well-knit community will be the result. There is no reason why the attitude of operatives towards a firm should be very different from that of the members of public schools, universities, and regiments toward their respective institutions. Loyal and enthusiastic operatives, surrounded by a sympathetic and friendly atmosphere, will experience a satisfaction which reduces boredom to comparative insignificance.

SOCIETY'S RESPONSIBILITIES TO THE REPETITIVE WORKER

Unless operatives are able to find facilities for development outside the factory, it seems probable that long and repeated exposure to monotonous conditions of work will have a dulling effect on mentality, and lead to the formation of habits which may impair their value as members of the community. It is undoubtedly largely true that workers who for years have been employed on simple repetitive operations, have no desire to change, and dislike being transferred to any process requiring judgment and thought. How far this attitude is the result of long exposure to monotonous conditions it is difficult to say, but it is probable that in the early stages of their industrial life they were eager to progress, but the absence of stimulation in the industrial environment has left them increasingly inert, and content to exist in the narrow groove of daily routine. Although in many individuals the natural tendency is to behave in accordance with the lines of least resistance, repetitive work seems to accentuate this tendency, instead of stimulating thought and action along original paths. It is probable, therefore, that the unfavorable effects of repetitive work are not confined to the industrial environment, but extend to activities outside the factory and have a detrimental influence on thought and behavior in general. The provision of attractive educational and cultural facilities is accordingly of the utmost importance, if the repetitive worker is to take her place as a harmoniously developed and worthy citizen.

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Measuring Susceptibility to Monotony

By Lorin A. Thompson, Jr.,[1] *Ohio Wesleyan University*

Monotony, with its baleful tendencies to pessimistic revery and obsessions, may not after all prove to be the bête noire of repetitive industry; for monotony is a function of the individual worker even more than of the particular job. Some day the highly repetitive work of the factories will be done by those who are by temperament and disposition especially fitted for it.
Dr. Thompson has analyzed afresh the nature of monotony, and developed new experimental techniques for measuring the differences between people in their susceptibility to uniformity of work.

This study is an experimental approach to the increasingly important question of how to measure or to predict susceptibility to monotony. The first part is a review of the literature with a critical statement of the problem; the second reports an experimental attack on the subject.

The method of approach consisted of having the subjects do four different types of work, each divided into a uniform phase and a varied phase. Records of both production and errors were kept for each phase of the work. The records were finally expressed in terms of decrement for each phase of each kind of work. This was done by dividing production for the first half of the work period by the corresponding figure for the second half. The per cent decrement for the varied phase was then subtracted from the per cent decrement for the uniform phase. This gave a single score which expressed the relative susceptibility to monotony of the subject for each type of work. A similar treatment was given the error record.

Other data were gathered from personal history blanks and rating scales which were filled out by each subject. Each individual was then rated independently by two trained raters. These data when combined yielded information which was weighted and combined into a criterion of susceptibility to monotony. It was found that a battery of four out of the twelve tests when optimally weighted gave a correlation of .71 with the criterion.

Susceptibility to monotony is but little influenced by intelligence status.

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[1] From the Psychological Laboratory of Ohio State University. The author wishes to express his appreciation to Dr. H. E. Burtt under whose direction this study was made.

MODERN industry with its tendency toward extreme specialization has brought many new psychological problems which in times past were unknown. Some of these problems may be viewed as by-products of a complex civilization, but others are of fundamental importance both to industry and to society. The days of the cobbler are past, and cobbling is practically a lost art. In the place of skilled workmen have come machines which have changed very materially the old industrial régime. This trend in industry has developed many specialized routine types of work which require only an ordinary amount of skill and can be learned within a relatively short time. From these conditions two important problems of interest to the psychologist have developed: first, fatigue; second, monotony.

MONOTONY AND FATIGUE

In distinguishing between the two problems, C. S. Myers (17) says,

> "We have come to distinguish between two main problems of activity,—the one (fatigue) involving the consumption of substance intracellularly laid down for outbursts of relatively intense, spasmodic activity, the other (adaptation) of whose nature we are wholly ignorant, demanding a special direction and resulting in an enduring set of the organism. The outcome of the former we may regard broadly as 'act,' the outcome of the latter as 'attitude.' Both must involve work and the expenditure and degradation of energy, but we may regard the 'act' as characteristic rather of mechanism and resulting preëminently in the degradation of energy, while the 'attitude' is characteristic rather of life, and is directed toward the elevation of energy. . . . . So long, for example, as the affect of interest is present the attitude of attention readily continues unaltered. As interest wanes, monotony enters. . . . . A favorable attitude thus goes with a favorable affect. The right 'set' being seemingly associated, therefore, with the activity especially of the autonomic nervous system."

WHAT IS SUSCEPTIBILITY TO MONOTONY?

We may then characterize susceptibility to monotony as an attitude. It involves the attitude and disposition of the workman more than the type of work. Münsterberg in speaking of monotony remarks that there is no possibility of telling objectively whether a job is monotonous or not. For example, he found a woman packing light bulbs who had been going through the same motions day in and day out for over twelve years. She reported that she enjoyed her work very much. In all probability this job would soon tire many workers and would result in their search for other work. Münsterberg describes monotony in terms of unpleasant feeling that the task arouses in the individual. Its characteristics are boredom and disgust.

More recently Robinson and Bills suggest that work decrement is due to the fact that a limited number of muscle groups are used,—that is, the more diverse the material and the greater the variety, the less the decrement. For any type or work there is a direct correlate of the recency and frequency with which that activity has been practised. In one of their letter-naming experiments, when the factor of competition was introduced, it tended to disturb the simple relationship between the degree of complexity of the work and the slope of the decrement curve.

These findings, contrary to the conclusions of the authors, seem rather to lend additional support to the contentions of Münsterberg and Myers that monotony is quite different from fatigue. They further suggest that monotony may best be determined in terms of individual susceptibility, which in Myers' sense, is a matter of attitude. Susceptibility to monotony may then be characterized as an individual difference which in some cases assists the individual in adaptation, and in others, interferes with adaptation. It is also highly probable that these "sets" are learned and tend to be specific rather than general.

HISTORY OF THE PROBLEM

Early Results of Münsterberg

Münsterberg (16) was the first to attack the problem experimentally. He presented lists of words verbally to different groups. In each list, either half of the words, or one more or one less, belonged to the same conceptual group, *e.g.*, flowers, birds, etc. The remaining words in the list were without any inner connection and were mixed in with the others in random order. The subjects were required to state whether the similar words were more or less numerous than the dissimilar words. The results were compared with a questionnaire dealing with certain daily habits which might reveal a liking for uniformity or variety.

Subsequently he used digits rather than words. He again found that similar impressions tend to inhibit each other, that is, (1) a digit occurring twice in a series of digits presented serially is often seen but once; and (2) digits quickly succeeding each other in a series have a tendency to fuse or inhibit each other. This tendency is found unequally developed in different persons. In summarizing, Münsterberg lays down three principles: "(1) individuals differ in degree in susceptibility to uniformity or monotony; (2) those individuals are most susceptible to monotony or uniformity who least recognize similarity and repetition; (3) those individuals are least susceptible to monotony who best recognize repetition and uniformity."

Dunford's Experiment

In 1924 at Ohio State University Dunford repeated Münsterberg's experiment. In general his procedure was very similar to Münsterberg's,—his conclusions, however, were contrary. Dunford found, for example, that there is a relationship between perception of similarity and subjective dislike of uniformity. The differences in results are due to different methods of analyzing their results. Münsterberg's analysis was simple and perfunctory. Dunford was a little more careful in both analysis and treatment of his data.

In view of the seeming unsatisfactoriness of this method, Dunford ventured on another approach. His method was to measure the individual differences in susceptibility by means of production records. His general plan was to divide a given type of work into two phases,—a uniform phase and a varied phase. His method was to plot individual production curves for each type of work. From these a third curve was constructed. The percentages of deviation were plotted as ordinates, and the order of the intervals or trials as abscissae. This gave a measure of susceptibility to uniformity which was converted into a score. The correlation between his questionnaire and the scores indicating susceptibiliy to monotony was found to be .67 ± .11. This method of approach was found in later work to be quite useful.

English Studies of Monotony

The English work is of unusual interest because many of the investigations were conducted in factories rather than in laboratories. Wyatt's (24) first investigation was with clerks filling orders for a wholesale drug company. Each item in a given order was assembled by the clerk filling the order. At the time Wyatt began his study filling from 6 to 12 orders a day was the average individual accomplishment. Wyatt's first change in procedure was the assigning to each worker of a single task to perform during the day. Under this system production decreased. These conditions represent extremes. The first condition is one of excessive distraction, and the second is one of great uniformity.

In another study Wyatt had three subjects working at three types of activity over a period of six weeks. The three types of work were, first, simple addition; second, mechanical computation; and third, a form of muscular work (pulling a string balance every half minute). When the subjects worked at all three tasks during the day they did from twenty to twenty-four per cent more work during the day than on those days on which they did the same task throughout the day. A difference was also found in the length of the work periods which were varied between thirty and fifty minutes. For these particular activities the fifty minute spell was slightly better.

Burnett (2) and Wyatt (24) in other studies suggest a relationship between susceptibility to monotony and intelligence. In both these studies, however, susceptibility to monotony was presumably indicated by a decrease in production or the level of efficiency on the job. Burnett used four subjects of different degrees of intelligence to do cross-stitching on a piece of wide meshed canvas. The experiment set out first to study the difference in output as revealed by differences in intelligence; second, the effects of various lengths of work periods and the effects of rest pauses on their output; and, third, to discover the optimal length of work period for this type of work. Of the four subjects, A and B were very intelligent, C was of average intelligence, while D was of low intelligence. The four girls were all seventeen years of age.

The subjects worked six hours daily in two spells of three hours, four days a week under four different conditions. The four conditions were: 1. (Tuesday) the workers paused whenever inclined to,—the rest pauses were unorganized; 2. (Wednesday) 15 minute rest pauses in the middle of the morning and afternoon spells; 3. (Thursday) the girls worked at maximum speed for the entire morning with no rest pauses and no talking was allowed; 4. (Friday) there were three rest pauses during the morning and afternoon spells distributed at even intervals. During the experiment the subjects were paid higher wages than usual in order to be sure that they would continue throughout the experiment. The results of the experiment may be summarized as follows:

SUBJECT	INTELLIGENCE RANK	OUTPUT RANK	OUTPUT INDEX
A	1	2	88
B	2	3	84
C	3	1	100
D	4	4	69

The production of C was taken as 100 and the others were compared with this base. Of the four subjects D's progress is most unstable. C's progress showed the least variability. A and B were capable of high production but could not maintain it, as they became noticeably bored after a time.

The average daily production record showed Thursday to be the highest. This was given an index of 100; Friday was next, index 94; Wednesday third, index 93; Tuesday 4, index 90. While the production records were greatest on Thursday, under which conditions no talking was allowed, the workers were usually disgruntled and out of sorts while working.

Wyatt (25) in a more recent study investigated the relationship between intelligence and monotony from another angle. In this experiment there were thirty subjects, all girls. The study was made in a soap factory where the girls were engaged in wrapping tablets of soap. Each process took 40 seconds and was repeated about 720 times daily. In an analysis of the activities several short tests were used to predict relative efficiency of the workers. The tests used and the correlation of the tests with efficiency on the job were as follows:

Efficiency on job with	*r*
Intelligence	.25 ± .114
Knotting	.03 ± .13
Match Insertion	.03 ± .13
Tapping	.18 ± .13
Touch Discrimination	.21 ± .13
Job Duplicate	.22 ± .13

The manual tests were repeated in three months in order to determine their reliability. A final test was also designed to duplicate the job itself. It consisted in having the workers wrap 50 tablets of soap. The reliabilities of the tests were: knotting test, .57; match insertion test, .35; tapping test, .68,—too low to yield very satisfactory predictions of efficiency on the job. Wyatt further found that variability of the workers could not be used as a satisfactory index of susceptibility to monotony.

Kornhauser (13) found in a survey of office workers that labor turnover was greatest among the most intelligent who were working at low grade jobs. The more intelligent workers could more readily secure better jobs. They also were easily bored and became disgusted if their work was not sufficiently difficult or varied.

In a recent study Wyatt and Fraser (27) have presented additional data on the comparative effects of uniformity and variety in work. Three kinds of work were studied: soap wrapping, handkerchief folding, and bicycle chain assembling. Each kind of work was executed under conditions of uniformity and of variety.

Measures of output were taken as the criterion of comparison. In the soap wrapping experiment the average hourly output was slightly higher for each operative under conditions of uniformity than under the varied conditions. The production increase being from .5 to 6.2 per cent higher under the uniform condition. Wyatt, commenting on the degree of variation in production under the two conditions says,

> "In three cases (workers A, B, and D) the rate of working under the varied method of procedure was significantly steadier than under the uniform conditions; in another two cases (workers C and E) the differences although steadier were not significant, while in the case of worker F the deviations from the average were slightly less when the work was uniform and continuous throughout the day. On the whole, therefore, in this group of workers, the more uniform rate of working appears to be associated with variety in the method of production."

A similar series of observations of operatives folding handkerchiefs under uniform and varied conditions revealed but slight differences in production under each situation. In the third part of the experiment in which the work records of four operatives were studied, the increase in production of the workers under the varied process was from 2.4 to 5 per cent. A study of the output curves shows that if the operatives were employed at a different task during the first half of the work spell, the subsequent decrease in efficiency during the second half was less.

In passing it seems that there are evidences of definite individual differences in susceptibility to uniform and varied activity in each part of the experiment. This suggests that variations in production under uniform and varied conditions are probably due more to differences in degree of susceptibility to uniformity than to the repetitive or varied nature of the work itself.

In the second part of this investigation, three experiments are reported in which the purpose was to determine (1) the optimum duration for one form of activity before changing to another, and (2) the most suitable type of work for the alternating processes. The three types of work selected were: tobacco weighing, cigarette making, and assembling cartridge cases.

In the cigarette making experiment a number of operatives complained of boredom under the conditions of uniformity. Output was uniformly better under conditions of variety. In the tobacco weighing experiment individual differences in daily output varied from 5 to 25 per cent. In this experiment production was slightly higher when the form of activity was changed twice per spell.

To account for the production decrement under conditions of uniformity the hypothesis is advanced that the fatigue is more local than general. Many repetitive operations require the use of the large skeletal muscles which are not easily fatigued, yet the condition of boredom develops noticeably more in some workers than in others. As has already been suggested in the present paper there is a difference between fatigue and monotony, and probably we shall understand monotony better if we emphasize the importance of individual differences to it as well as emphasizing the differences in kinds of work.

Wyatt's conclusions concerning the nature of light repetitive work are

(1) Uniformity in the method of procedure is generally less productive and conducive to greater irregularities in the rate of working than are varied forms of work;

(2) The highest output is obtained when the form of activity is changed after 1½ or 2 hours of unvaried work;

(3) Many changes are detrimental to output because of their interference with the swing of work.

In addition there is a certain amount of evidence to show that

(4) In repetitive work of a fatiguing nature, changes in the form of activity should be relatively more frequent;

(5) A high degree of resemblance between the alternating forms of activity, although subjectively satisfying, is not conducive to increased output.

In "Boredom in Industry," Wyatt gives a more generalized statement of the problem of boredom than is to be found in reports of his experimental studies (28). Here he presents an analysis of the psychological problems related to monotony, suggesting various ways to combat it. The present writer believes with Wyatt that there is another promising approach to the problem: the possibility of discovering and allocating people who like repetitive work and who dislike varied work. This problem is related to the more fundamental one of temperament and disposition, which has much to do in determining whether an individual prefers routine to change.

CRITIQUE OF METHODS

Previous investigations of the problem of susceptibility to monotony have been suggestive of technique, but none as yet has developed either a satisfactory criterion of susceptibility or a group of satisfactory tests. The approaches of Wyatt, Burnett and other British investigators have been somewhat unsatisfactory because of their failure to define the problem accurately. In all of their investigations there is a confusion between efficiency on the job and freedom from susceptibility to monotony. Their studies, however, do suggest that while degree of intelligence is not the most important factor in determining susceptibility, emotional stability plays a rather important rôle.

Münsterberg's early work made the best approach toward defining the problem of susceptibility to uniformity, but his technique in the light of present day statistical considerations is very meager. It must be remembered, however, that Münsterberg called attention to the problem and succeeded in pointing out its nature.

Dunford's technique was a decided improvement in that he devised a new means of measuring this capacity.

Following the lead of Dunford, the procedure in the present study was to compare an individual's performance at the same general type of work under two situations,—namely, a situation of uniformity and one of variety. Four types of work were selected, each of which was divided into two phases, a uniform phase and a varied phase. A punch board, paper and pencil maze drawing, number cancellation, and a crank apparatus were used in the experiment. Upon analyzing the data it was found that the ratio of production in the first half of a work period to that in the second half afforded a rather sensitive measure of decrement for each half. That is to say, if production during the first half of the work spell were larger than the production for the second half, the quotient would be greater than unity. Similarly, if production were greater for the second half than for the first half, the ratio would be less than unity. Production ratios for both the uniform and the varied phases of any task could then be subtracted from each other and a single score obtained which represented whether or not the individual were susceptible to uniformity in that particular kind of work. These scores could then be compared with the criterion.

MEASURE OF SUSCEPTIBILITY USED

Both Münsterberg and Dunford used questionnaires dealing with one's attitude toward various daily habits which might seem to reflect one's preference for a uniform or a varied type of existence. In the present study a similar though longer list arranged in the form of a graphic rating scale was used. In the original list there were 47 items. This was submitted to a group of twelve judges who were instructed to rate the items from uniformity to variety, or from variety to uniformity as the case might be, and to exclude any that in their judgment were not properly scaled or were ambiguous.

From these data the following weighting scheme was adopted. Those items on which 10, 11, or 12, of the judges agreed on the scaling were given twice the value of the others, that is, the value originally assigned such items on the graphic rating scale was multiplied by 2. Those items on which 7, 8, or 9 of the judges agreed but which were regarded as ambiguous by the remaining judges were given the regular value (from 1 to 10) on the graphic rating scale. All items in which the judges disagreed were rejected. The position taken regarding this matter of accepting or rejecting an item is in brief as follows: an item which 9 of the judges scale in one way and two of the others reverse the scaling is a less valid item than one about which there is a definite agreement among those who do not regard the item as ambiguous.

In addition to weighting the items in the scale they were so arranged as to avoid any possible "halo" effect (11, 12). Following are some typical items in the scale:

1. How often have you moved of your own accord?

Several times yearly	each year or so	few times	never

2. At the present time do you get up at the same hour each morning during the school year?

No, different time each day	yes, when necessary	always

3. When you read or study where do you sit ordinarily?

Same chair in same place	change occasionally	prefer to change often

In order to make the rating scale a little more accurate, additional ratings were secured from men who had known each person to be rated from one to three years. The reliability of self ratings and the test material was then determined by the method of self correlation,—that is, correlating the odd numbered items against the even numbered. The coefficients of correlation thus obtained were then corrected with the Spearman-Brown Prophecy formula. These appear in table 1.

TABLE 1

Correlations of graphic scale items

	SENIOR X	SENIOR Y	SELF-RATINGS
Senior X	.79	.32	.23
Senior Y		.44	.01
Self-ratings			.45

From table 1 one notices that the senior ratings do not correlate very highly with one another, nor do they correlate to any large degree with the self-ratings. The most probable interpretation of this is that each rating is probably a measurement of a different phase of the individuals' susceptibility to uniformity. These ratings were then weighted and combined according to the squares of their respective reliabilities. Thus an individuals' single total score for susceptibility to monotony could be obtained by multiplying his score obtained on X by 3, and adding in his score on Y and the self-rating. It is estimated that this yields a criterion with a statistical reliability of approximately .9.

OTHER FACTORS IN SUSCEPTIBILITY TO MONOTONY

To shed further light on the whole problem, additional data of a different sort were collected. A rather comprehensive emotional history was arranged in the form of a graphic rating scale. There were 91 items in the list. Many of the items were similar to the Emotional History Record of Watson and Chassell (5) except for the revision in the form of a graphic rating scale. This is called Form I. Following are sample items from the scale.

1. Do you sleep poorly?

Never	Seldom	Occasionally	Usually	Most of the time

2. Do you worry too much about little things?

No	Occasionally	Much of the time

29. Are you ever troubled with dreams of people being dead or about robbers?

Never	Once in a while	Often

The items were scrambled in chance order and inverted so as to avoid possible "halo" effects.

Form II was a continuation of the personal history record. Samples of typical questions from Form II are:

Have any of your near relatives been insane, epileptic, or feeble minded?............. Yes....No....
Was your home characterized by marked demonstativeness?... Yes....No....
Did older persons attempt to determine your career?......... Yes....No....

These items were answered either "yes" or "no." The subject was instructed to encircle "yes" if the answer described him or to encircle "no" if that were the better answer. In scoring, the items were tabulated separately and the frequency of "yes" and "no" replies was totaled for each item. The items were in turn weighted according to their uniqueness (7).

The questions in Form II were similar to those used in the Woodworth-Wells psychoneurotic inventory. There were 70 items in the scale.

Form III was a modification of Freyd's (8) introvert-extrovert scale. The items were arranged in the form of a multiple choice test. The subject was instructed to place in a space provided at the right hand side of the page the number of the phrase which most accurately described him.

Finally the percentile score made by each subject on the Ohio State University Intelligence Test, was secured.

ADDITIONAL TECHNIQUE

In addition to the rating scores, emotional history records, and intelligence test scores, several pieces of apparatus were designed further to investigate the problem. The kinds of work selected had to be of such a nature that they could easily be divided into a very simple uniform phase and a more complex varied phase. The general assumption being that if a person is susceptible to monotony, this suceptibility will manifest itself most easily and quickly by comparing the error and production records of each subject's performance at the uniform and varied phase of the same general type of work. The four types of work selected in the present experiment which permitted of this easy division were (1) work at a simple punch board, (2) work at a simple crank, (3) work at paper and pencil mazes, and (4) work at number cancellation.

The Punch

The Punch apparatus was a simple device consisting of two brass plates 6 inches x 6 inches mounted upon a wooden board 7 inches x 10 inches x 1 inch. The bottom plate was three-eighths of an inch from the top one and parallel to it. In it were punched 25 holes $\frac{1}{2}$ inch in diameter, 1 inch apart from center to center, and arranged in a square pattern. The plates were insulated from each other by fibre posts at the corners. A binding post was attached to each plate. The stylus used for making contact with either plate was a brass rod $\frac{3}{16}$ inch in diameter sunk into a wooden handle $\frac{3}{4}$ inch in diameter at each end but hollowed out to fit the hand conveniently. A flexible wire led from the punch to the anode.

When the stylus touched the bottom plate a circuit was closed through an electric counter which recorded the number of contacts. If the stylus touched the top plate a circuit was made through a buzzer and a second counter.

The Punch was placed on a flat top table at an angle of 15 degrees from the plane of the table. The subject was seated upon a high stool when he was working at the apparatus. There was an arm rest on the table which elevated the arm 3 inches from the table adjustible to the comfort of the subject. As the subject was working he was instructed to hold the wire leading from the stylus in his left hand in order not to interfere with the task. He then received his instructions and was allowed to practice for one minute after which he was told to begin. Production was recorded no one counter and errors on the other. The buzzer warned him of his mistakes.

The counters used were small Veeder counters operated by 6 volt electro-magnets. When the circuit was closed an extension of the armature threw the counter lever. A spring took the lever back to the initial position the instant the circuit was broken. The counters operated efficiently at a speed considerably greater than that required. These were placed on the experimenter's table which was behind the subject. The position and arrangement of the apparatus was such that the experimenter could watch the subject.

The simple task consisted of making an X pattern on the apparatus by placing the stylus successively in the holes of the two longest diagonal paths. The actual pattern was 1, 7, 13, 19, 25; 5, 9, 13, 17, 21; 1, 7, 13, 19, 25; etc.[2] The subject began at the upper left hand corner, traveled to the lower right hand corner, thence to the upper right hand corner, and descended to the lower left hand corner, and then repeated the operation throughout the first work period.

The varied task consisted of making a more elaborate pattern in the same fashion as for the simple phase of the experiment. The pattern followed was: 5, 9, 13, 17, 21; 10, 14, 18, 22, 1; 15, 19, 23, 6, 2; 20, 24, 11, 7, 3; 25, 16, 12, 8, 4; 5, 9, 13, 17, 21; etc.

The subject worked at this task for a period of ten minutes following his instruction and his practice period of one minute under the supervision of the experimenter.

The Crank

The Crank apparatus consisted of a cylinder 4 inches long and 3¼ inches in diameter enclosed in a box provided with a crank which made contact at various places on the exterior surface of the cylinder. At intervals of 1 inch on the exterior surface of the cylinder were two pairs of contact screws. All four screws were in the same straight line. Those screws of a pair were as close together as possible without being contiguous. These were raised above the surface of the cylinder ⅛ inch. The inside screws of each pair were connected to the same binding post. This made it possible to record production from the contacts which the subject made during his task. The outside screws were connected in a similar manner and led to a second binding post. Contact with the outer screws was recorded as an error. Through the center of the cylinder was an axis rod $\frac{1}{32}$ inch in diameter. Encircling the external surface at the middle was a groove ⅜ inch wide which was used as a starting point for the subject operating the apparatus.

The axis rod of the cylinder extended to the outside on the left side of the box. Attached to the end of the axis was a knob which was used to rotate the cylinder which permitted the different sets of contacts to be exposed. The left end of the cylinder had a large circular collar which was 2¾ inches in outside diameter and 2¼ inches in inside diameter. This collar was connected to all of the inside contact screws and served as a terminal for them. It made a continuous contact with a copper brush on the inside of the box in which the cylinder is inserted. The brush in turn was connected to a binding post on the outside of the box. The axis rod served as a terminal for the outside contact screws. The axis rod also made continuous contact with a spring wire which was fitted tightly against it when the cylinder was inserted in the box. The spring was connected to a third binding post.

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[2] The holes were not numbered, but to clarify the description, No. 1 was the hole in the upper left hand corner; No. 5 was in the upper right hand corner; No. 6 was below No. 1, etc.

Encasing the cylinder was a small wooden box 6 inches x 4$\frac{3}{8}$ inches x 4$\frac{5}{8}$ inches. One side was open to permit the cylinder to be inserted and removed easily. In the ends of the box were two slots $\frac{3}{8}$ inches wide extending horizontally to the center of the ends. The line of the right groove was $\frac{1}{4}$ inch higher than the slot at the left end but was hollowed $\frac{1}{4}$ inch at its terminus which permitted the axis to be level and firm when in use.

The spring wire was connected to a binding post on the left end of the box. The groove on the left end did not have the additional socket in the wood. On the top of the box was a counter sunk aperture $\frac{1}{4}$ inch wide and 4$\frac{1}{4}$ inches long. This enabled the subject to see the pairs of contracts with which he was working. On the under side of the top was a $\frac{1}{4}$-inch rack and a 10 tooth pinion. The rack had a brass extension which was visible through the aperture; on its other end was a small crank whose drop lever was 1 inch long. The metal covering of the pinion served as an electrode which was connected to a binding post on the outside.

The pairs of outside contacts were connected in series with a buzzer and counter which recorded each contact made with the indicator. These were considered as errors. The pairs of inside contacts were connected with another counter which recorded the contact with the indicator which was regarded as production. The subject turned the crank which moved the indicator in a horizontal plane visible through the aperture as it glided back and forth between the contact points of the cylinder. The apparatus was fastened firmly to a table. This made it possible for the subject to work seated on the stool as he did at the Punch.

In the simple phase of the experiment the subject turned the crank back and forth between the longest pair of inside contacts. In the complex series the subject turned the crank from the center groove to the inside contact to the left, thence to the inside contact to the right then back to the center. With the left hand he then turned the knob at the left end of the box forward until the next pair of contacts came into view, and then proceeded similarly for the remainder of the work period.

While at work the subject was told to seat himself comfortably at the apparatus. He was given his instructions, and after a practice period of one minute proceeded with the task.

Cancellation

The uniform phase of the number cancellation task consisted in having the subjects go through lists of numbers and cancel all of the 8's. There were 51 numbers in each line and 20 lines to the page. The subject was given several sheets so that he could not finish before the work period was completed. Each worked at this for ten minutes. The number of 8's cancelled and the number of errors and omissions were recorded for each half of the work period. The varied phase consisted in having the subject go through the same list of numbers and cross out 5's and encircle 3's until he came to 7, when he was to encircle 5's and cross out 3's until he came to 7, then reverse the process again, etc.

Mazes

The pencil mazes were patterns worked out on a typewriter. The uniform pattern was a cross with each sheet containing six patterns, all alike. The letters on the patterns were C's and X's. The subject was given instructions quite similar to those of the number cancellation and was told to begin with A and trace the shortest path of X's to Z, being careful not to cross out a C, to cut corners nor travel diagonally. If he made a mistake he was instructed not to retrace his path, but to continue. Incorrect excursions were scored as errors.

The complex pattern consisted of six more difficult patterns, each different. There were six mazes on each sheet. When working at either phase the subject was given sufficient number of sheets to provide for the work period.

The method of scoring the mazes was to count the total number of corners completed. This was called the production score. Any false excursion was counted as an error. Both production and error scores were kept for each half of both phases of this part of the experiment.

The different types of work described were done under standard laboratory conditions. Each subject reported on two different occasions, once during the fall quarter and once during the winter quarter. The net amount of testing time required for each of the subjects was 40 minutes on each occasion.

A ten minute work period was selected on the basis of some preliminary experimentation. A five minute rest period was used between successive work periods to obviate the possibility of fatigue and transfer effects. The plan and distribution throughout the experiment was for the subject to work at the uniform phase of the Punch, rest five minutes, then work for ten minutes at the simple mazes, rest five minutes, work at the varied Punch pattern, rest and then work at the complex mazes.

HOW THE DATA WERE HANDLED

After a careful inspection of the data, the method finally used as an indication of the degree of susceptibility of the subject was to divide his production record for the first half of the ten minute work period by his production record for the second half of the work period. This ratio yields what might be called a Production Decrement ratio for each phase of each kind of work. If the Production Decrement ratio of the varied phase is subtracted from the corresponding ratio of the uniform phase, a single score is obtained which expresses the degree of susceptibility to uniformity of the subject for that particular kind of work. If the subject's score were minus, it presumably indicates a lack of susceptibility to monotony; if the score is plus, it presumably indicates susceptibility. Treating the data in this manner commends itself in that (1) the scores are not influenced in any way by the rate at which the subject works; (2) the score expresses the relative efficiency of each subject to uniform and varied phases of the same general type of work; and (3) the final score is not only easily obtained, but is accurate and easily interpreted.

TABLE 2

Summary of data for intercorrelations

SUBJECT	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
1	1289	27	142	313	49	18.5	9.39	13.8	10.9	.46	.46	2.0	.64
2	1285	100	160	230	14	21.5	9.52	12.2	9.3	.50	.41	2.08	.49
3	1453	55	162	316	7	13.8	10.03	10.2	12.3	.59	.61	2.03	.57
4	1735	50	152	309	32	17.4	10.66	13.1	14.4	.35	.30	2.19	.78
5	1637	97	155	331	85	18.0	9.79	10.6	12.2	.37	.60	2.29	.33
6	1651	76	157	292	7	18.1	7.0	15.7	7.5	.56	.32	2.05	.28
7	1244	81	148	355	92	18.0	10.39	12.6	8.6	.78	.63	2.15	.54
8	1643	46	147	322	56	21.7	8.0	8.2	14.3	.45	.40	1.74	.10
9	1534	66	175	306	21	10.1	10.00	9.7	12.2	.38	.47	2.00	.58
10	1098	62	179	348	86	24.4	2.28	3.3	7.9	.65	.43	2.79	.96
11	1536	77	150	294	15	9.3	8.82	12.1	11.7	.46	.91	1.60	.47
12	1466	61	155	280	39	12.2	10.33	11.0	8.7	.55	.65	1.86	.55
13	1681	18	156	249	26	16.2	2.25	16.2	10.0	.38	.62	1.74	.54
14	1640	75	151	275	22	8.4	11.25	15.7	13.3	.48	.60	1.55	.78
15	1586	17	151	289	39	16.1	12.0	13.9	11.6	.80	.75	2.25	.58
16	1699	63	162	272	24	1.5	2.54	15.7	10.7	.46	.50	2.19	.64
17	1601	9	153	272	60	20.8	3.9	12.75	9.5	.62	.70	2.10	.64
18	1698	78	151	280	25	15.5	12.0	8.5	7.2	.59	1.06	1.86	.60
19	1601	98	167	329	38	28.3	8.48	12.5	10.0	.56	.56	2.02	.56
20	1563	78	158	243	18	8.35	9.9	10.0	10.1	.57	1.02	2.16	.58
21	1663	32	154	267	44	12.0	10.0	15.0	8.0	.51	.49	.62	.45
22	1679	98	142	336	46	14.2	9.8	15.8	9.7	.46	.67	2.34	.13
23	1703	71	152	270	35	16.0	12.32	9.5	10.7	.22	.56	2.46	.52
24	1654	100	147	226	10	18.1	7.9	12.8	8.5	.50	.68	2.20	.38
25	1705	93	145	235	15	11.3	5.3	13.0	8.0	.40	.50	2.25	.43
26	1916	83	164	261	51	15.0	12.2	9.0	11.2	.51	.54	1.97	.47
27	1321	1	171	351	30	17.6	7.4	13.0	12.25	.49	.43	2.13	.60
28	1841	39	173	308	37	30.6	4.3	11.0	9.0	.44	.46	1.97	.48
29	1614	87	143	290	25	15.6	19.8	3.4	10.2	.53	.47	1.84	.44
30	1595	89	166	381	45	17.9	9.75	7.6	15.47	.50	.45	2.24	.61
31	1452	17	166	375	25	16.4	7.13	8.4	10.4	.44	.50	2.46	.42
32	1598	94	148	307	66	14.1	10.00	18.0	10.5	.45	.59	2.57	.90
33	1899	81	158	258	65	14.5	8.78	11.0	8.9	.48	.38	2.55	.38

The error scores were handled similarly. However, in order to have an error score which is not influenced by the rate at which the subject works, the errors must be reduced to percentages for each half of each work period. Furthermore, since the errors have been reduced to a percentage basis, instead of dividing the error record of the first half by the error record of the second half, the percentage of errors of the second half of the work period were subtracted from the percentage of errors of the first half. These scores are called Percentage Decrement scores. The Percentage Decrement scores of the varied phase were then subtracted algebraically from the corresponding score of the uniform phase. This score was then comparable to the Production score, but the interpretation is reversed, *i.e.*, a plus score indicates a lack of susceptibility, whereas a minus score presumably indicates susceptibility.

The complete scores of all the data are found in table 2. The final score of each subject for each type of work and for each questionnaire appears in table 2. In the first unnumbered column are the numbers of the subjects (1–33). In the second column under I, are the weighted criterion scores (Susceptibility to Monotony)[3] of each subject. Under II are the percentile scores of the Ohio State University Psychological Test. Under III are the scores on the introvert-extrovert scale. Under IV are the scores on the emotional history records and V, scores on the personal history blanks. Under VI, VII, VIII, and IX are the Error Decrement Scores for the Punch, Crank, Mazes and Cancellations. To simplify the treatment of these data a constant was added to each score to obviate the necessity of handling 0 scores. Considerable confusion results in tabulating a scale from −.15 to .15 in the proper allocation of a 0 score. This procedure does not alter the distribution, but shifts the origin. The constant added in every case was just larger than the greatest minus score. Under X, XI, XII, and XIII are the "P" or Production Decrement Scores as described on page 185 for the Punch, Crank, Mazes and Cancellation respectively. Constants similar in nature to those used in variables VI to IX were likewise used to eliminate the 0 and negative scores.

The successive rows of table 2 present the modified results for each of the subjects on each of the 13 variables. The numbers of the variables appear at the top of each column.

Using the data in table 2 each test was correlated with the criterion (Susceptibility to Monotony) and with every other test. Table 3 contains the r values of the intercorrelations as found by the Pearson product-moment method. These coefficients indicate the validity of each test as well as the degree of overlapping with the other tests. Furthermore, from them the partial correlations and the regression equation were computed so that the tests might be combined optimally.

INTERPRETATION OF TABLE 3

To interpret table 3 it will be remembered that a low score on 1, indicates susceptibility to monotony, and that a high score indicates lack of susceptibility. A low percentile score in 2 indicates a relatively low degree of intelligence as compared with college freshmen. Thus a correlation of +.21 between intelligence and susceptibility to monotony indicates that there is a slight inverse relationship between the degree of intelligence and the degree of susceptibility to uniformity. This will be further elaborated after the presentation of the partial correlations. A correlation of −.13 suggests that there is a very slight tendency for the extrovert to be more susceptible than the introvert, for a low score on III indicates a tendency toward introversion and a high score indicates a tendency toward extroversion.

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[3] See Measurement of Susceptibility to Monotony as described on page 185.

The relationship between 4 and 1 is very suggestive. A high score in 4 indicates relative instability whereas a low score indicates relative stability. A coefficient of −.46 indicates a rather definite tendency for the more unstable person to be much more susceptible to monotony than the more stable person and vice versa. The personal history blank suggests the same thing although much less emphatically. From the intercorrelation between 4 and 5 there is a considerable amount of overlapping. In considering the next four coefficients one would suspect *a priori* that a low

TABLE 3

Coefficients of correlation

	1	2	3	4	5	6	7	8	9	10	11	12	13
1		.21	−.131	−.457	−.207	−.148	.154	.182	.06	−.456	.004	−.15	−.386
2			−.17	−.17	−.01	−.12	.16	−.08	−.15	−.06	−.12	.18	−.16
3				.28	.05	.26	−.37	−.34	.06	−.02	−.29	.19	.29
4					.42	.29	−.11	−.30	.44	.10	−.21	.23	.07
5						.35	−.08	−.17	−.18	−.29	−.14	.33	.12
6							−.18	−.23	−.18	.14	−.28	.19	−.07
7								.08	−.33	−.08	.29	−.25	−.03
8									−.06	−.08	.01	−.20	−.03
9										−.33	−.18	−.06	.12
10											.27	.01	.15
11												−.08	.06
12													.17

Legend of variables

1. Form IV (average)
2. Intelligence Percentile
3. Form I
4. Form II
5. Introvert-extrovert Scale
6. Error Decrement Punch—*E*
7. Error Decrement Crank
8. Error Decrement Mazes
9. Error Decrement Cancellation
10. Production Decrement Punch—*P*
11. Production Decrement Crank
12. Production Decrement Mazes
13. Production Decrement Cancellation

score would mean susceptibility while a high score would indicate a lack of it. It is to be remembered that these are error decrements. The fact that the coefficients between 1 and 6, 7, 8, and 9 are all low precludes the possibility of using them to predict susceptibility to uniformity. There is a faint suggestion, however, that the same person will differ in his susceptibility to different sorts of work. This fact is much more marked in the next four variables, viz., the *P* values of the four types of work. It will be remembered that for the *P* values a high score indicates susceptibility and a low one a lack of susceptibility to uniformity. The production decrements for both the punch and cancellation tests indicate a marked relationship between the size of the decrement ratio and susceptibility as measured by the criterion. There is on the other hand, only a slight relationship betwen 1 and 12. The relationship between 1 and 11 suggests that it is unsatisfactory as a predictive measure. Inspection of the last four coefficients indicates that the subjects were somewhat more susceptible to monotony in terms of the Cancellation Tests than of the Mazes, and in turn were more susceptible to monotony on the Punch than any of the other types of work.

The relative amount of overlapping between the variables can readily be obtained from a more detailed study of the table of intercorrelations. The exact amount and the extent to which each test overlaps with every other test can be easily observed in the following manner: Suppose we select test 5 for example. Descending the column labelled 5 we discover that 5 correlates with 1 to the extent of −.207, with 2 to the extent of −.01, with 3 to the extent of .05, with 4 to the extent of .42. Then by following the next horizontal row across we find that 5 correlates with 6 to the extent of .35, with 7 to the extent of −.08, etc.

Those intercorrelations which are most interesting are those between the variables which were selected by the multiple ratio procedure (cf. p. 190). It will be noted that the correlations between 2 (Intelligence) and 4 (Emotional History Record) is −.17 which indicates slight negative relationship, between 2 and 10 (Punch Production decrement score) −.06, which suggest that those two variables are relatively independent of each other. 2 and 13 (Cancellation Production decrement score) show again a slight inverse relationship. The correlations between 4 and 10, and 4 and 13 are low and indicate but a very slight amount of overlapping. The coefficients of correlation are .10 and .07 respectively. Since 10 correlates to the extent of .15 with 13 this again shows a very small amount of overlapping. In certain of the other intercorrelations there is a high degree of overlapping, *e.g.*, between 4 (Emotional History) and 5 (Personal History) which correlate to the extent of .42. This suggests that emotional instability as measured by 4 is correlated to the extent of .42 with unique personal history. In addition the correlations between 3 and 7, 3 and 6, together with 3 and 11, 3 and 12, and 3 and 13 are interesting. In the introvert-extrovert scale 3, the higher score indicates extroversion and the lower score indicates a tendency toward introversion. The error decrement differences of E values (cf. p. 185) which are largest suggest *a priori* a lack of susceptibility while the lower suggests a tendency toward susceptibility. But 6 and 7 do not correlate appreciably with the criterion so that the *a priori* assumption in this case does not seem warranted. If the error (E) decrement differences are at all suggestive, it is quite evident that the differences are not uniform for all types of work. The correlation between 3 and 6 suggests that the extrovert has the largest decrement difference ($r = .29$) while in 7 it has the smallest E value as the correlation between 3 and 7 is $-.37$. The same interpretation can be made between 3 and 11 (Production decrement crank P value) and 3 and 13 (Cancellation production decrement P value) except that here it will be remembered that a higher decrement ratio difference or P value indicates susceptibility, and a low one a lack of susceptibility. This suggests that the susceptibilities tend to be specific rather than general,—otherwise one cannot account for a positive correlation for one type of work and a negative one for another type of work.

The next step in the procedure was properly to weight and combine those tests that would give the maximum prediction of the criterion.

The tests were combined and weighted according to the method outlined by Toops in his Multiple Correlation ratio chart (21, 22). Toops' Multiple Ratio is a technique of correlation by which the several best tests predicting a criterion can be selected from a larger group of tests without having to resort to the more tedious partial correlation method. The general procedure is to select first the test that correlates highest with the criterion and assign it a value or weight of 1.

The second test to be placed in combination is then determined by the formula

$$\beta \frac{U}{C} = \frac{r_{IU} - r_{IC} \times r_{UC}}{r_{IC} - r_{IU} \times r_{UC}}$$

where

β = a true multiple weight (in this case 1).
C = combination of 2 tests at beginning of process.
U = unique test or factor to be added.
X = criterion.

The third test is placed in combination at a weight given by the following formula

$$\beta = \sqrt{\Sigma W_y^2 + 2 \Sigma r_{xy} \times W_x W_y \cdot \frac{r_{IC} - r_{IC'} - r_{UC'}}{r_{IC'} - r_{IU'} \cdot r_{UC}}}$$

W = weight of β
y = any variable that has been added
r_{xy} = intercorrelations of the added variables
W_x = weight of one added variable
W_y = weight of another added variable
X = criterion
C = combination of 1 test existing at beginning of process
C' = desired combination (to be obtained by adding a factor to C)
U = unique test or factor to be added
r_{IC} = correlation of the criterion with existing combination (one test at the beginning)

$r_{IC'}$ = correlation of criterion with desired combination
r_{IU} = correlation of criterion and the unique factor
r_{UC} = correlation of unique test or factor to be added to the existing combination.

Additional tests are added in the same manner until there is no appreciable gain in the correlation between the criterion and the combination of tests. The generalized formula using the above notation is

$$r_{IC} = \sqrt{r_{IC}^2 + r_{IU}^2 - 2\frac{r_{IC}\cdot r_{IU}\, r_{UC}}{1 - r_{UC}^2}}$$

The Multiple Ratio Correlation indicated that the four variables which would best predict the criterion when combined according to their optimal weights were 4, 10, 13, and 2; viz., Emotional Stability, Production Decrement Ratios of Punch and Cancellation, and Intelligence. This revealed that those four tests when optimally combined would give a correlation of .71 and that in addition, a combination of other additional tests would not appreciably increase the prediction of the criterion.

In the interest of further simplicity, we shall now refer to Variable 4 as 2; 10 as 3; 13 as 4; and 2 as 5. This will simplify matters later in referring to the tests when treated with the partial correlation technique. The weights of the selected tests will then be designated respectively as subscripts 2, 3, 4, and 5. The values are given in table 4.

TABLE 4
Weights assigned selected tests

TESTS	WEIGHT
2	1.
3	.998
4	.783
5	.0074

From the weights when the standard deviations are known, the regression equation for the gross scores may be written according to the following formula:

$$X_e = \frac{\beta_1}{\sigma_1} X_1 + \frac{\beta_2}{\sigma_2} X_2 + \ldots\ldots \frac{\beta_n}{\sigma_n} + K$$

Where:

X = the most probable score on the criterion as predicted from the tests.
β_1 = weight value of first test selected
β_2 = weight value of second test selected
σ_1 = σ of first test selected
σ_2 = σ of second test selected
(Subscripts apply to the added test)
K = constant.

TABLE 5
Sigma values

σ_1 = 74.00
σ_2 = 3.74
σ_3 = .1135
σ_4 = .1765
σ_5 = 25.55

The regression equation for the preceding tests would be

$$X_1 = \frac{\beta_2}{\sigma_2} X_2 + \frac{\beta_3}{\sigma_3} X_3 + \frac{\beta_4}{\sigma_4} + \frac{\beta_5}{\sigma_5} + K$$

Where X_1 = criterion and subscripts 2, 3, 4, 5 refer to added tests.

The β values are given on the preceding page and in table 4.

The σ values are given in table 5.

Substituting, the regression equation becomes

$$X_c = \frac{1}{3.74} X_2 + \frac{.9998}{.1135} X_3 + \frac{.783}{.1765} X_4 + \frac{.0074}{25.55} X_5$$

$$X_c = .27\,X_2 + 8.808\,X_3 + .444\,X_4 + .029\,X_5$$

which gives the most probable score on the criterion of any person on the basis of the tests weighted optimally.

The four tests selected by the previous method were next treated with the partial correlation technique to analyze out the intrinsic relationship existing between the various tests and the criterion, *i.e.*, the relationship between emotional stability and susceptibility to uniformity independent of intelligence, and performance in the other two tests. There were four partial correlations of the third order computed to determine the exact amount of relationship between each variable and the criterion. These correlations were computed according to the standard procedure described in Yule (29).

For computing the partial coefficients of the first order the formula is

$$r_{12.3} = \frac{r_{12} - r_{13}\,r_{23}}{\sqrt{1 - r^2_{13}}\,\sqrt{1 - r^2_{23}}}$$

where

r_{12} = relationship between 1 and 2 with 3 constant

r_{12}, r_{13}, r_{23} = coefficients of zero order

The values for the partial coefficients of the second order are computed from those of the first order, and of third order from those of the second order according to the following equation:

$$r_{12.34\,.....\,n} = \frac{r_{12.34\,...\,(n-1)} - r_{1n\,34\,....\,(n-1)} \cdot r_{2n\,34.\,...\,(n-1)}}{\sqrt{1 - r^2_{1n.34\,...\,(n-1)}}\,\sqrt{1 - r^2_{2n\,34\,.....\,(n-1)}}}$$

where

$r =_{12.34.\,n}$ = relationship between 1 and 2 with 34. . . .n constant

$r_{12.3}$; $r_{13.2}$; etc. coefficients of the first order

$r_{12.34}$; $r_{13.42}$; etc. coefficients of the second order

$r_{12.34....}(n-1)$; etc. coefficients of the $(n-1)$ order.

The values for the partial coefficients of the first order are computed from those of the second order, those of the second order from those of the first order, etc. The values of the partial coefficients of the third order are found in table 6. These four factors combined according to the multiple ratio method yielded a coefficient of .71 with the criterion. It is possible to check this method by the following formula using the partials:

TABLE 6

Values of partial r's of third order

$r_{12.345} = -.47$ (Emotional history)

$r_{13.245} = -.45$ (Production decrement: Punch)

$r_{14.235} = -.37$ (Production decrement: Crank)

$r_{15.234} = .11$ (Intelligence)

$$1 - R^2 = (1 - r^2_{12})\,(1 - r^2_{13.2})\,(1 - r^2_{14.23})\,(1 - r^2_{15.234})$$

where R = the multiple coefficient contained by combining the tests optimally and correlating the weights score with the criterion.

r_{12} = coefficient of the zero order

$r_{13.2}$ = coefficient of the first order

$r_{14.23}$ = coefficient of the second order

$r_{15.234}$ = coefficient of the third order

Substituting the $1 - r^2$ values in the equation we have

$$.4959 = .78 \times .78 \times .84 \times .98 = .50$$

which is a close approximation. As a final check on all computations the original data in table 2 weighted according to the regression equation were correlated with the criterion. The coefficient of correlation was found to be .71. This checks all of the other computations. We can now observe more carefully the intrinsic relation between the variables.

The factors which contribute most heavily to susceptibility to monotony are emotional instability, and production decrement ratio of the punch apparatus. They are practically of equal importance. Likewise the production decrement ratio for the cancellation test indicates a marked relationship in the same general direction, viz., that those subjects who were most effected by the uniform work were those who were most susceptible to monotony on the criterion. The last result is rather interesting in that it shows that the problem of susceptibility to uniformity is not so much a matter of intelligence, but rather of emotional attitude.

This conclusion would seem to contradict the results of the previous findings of Wyatt and of Münsterberg particularly. Münsterberg's notion was that those people who are most susceptible to monotony were those who had the greatest difficulty in discovering that the job was of a routine nature. It is difficult to state whether Münsterberg had the factor of intelligence or some other factor such as attitude in mind. If he had intelligence in mind it is obvious that it plays but a minor rôle while the emotional attitude of the person does play a very important rôle in enabling us to predict whether or not he is susceptible to uniformity. On the other hand if Münsterberg meant an emotional "set" or attitude or disposition then his general notion is quite in keeping with the present findings. Wyatt working in industry used as his criterion efficiency on the job which, as has been pointed out previously, is not a satisfactory criterion for the variable he was trying to isolate.

It is also of interest and importance to emphasize what the data suggest that is, if a factor such as performance is to be selected as a predictive measure, some expression of the relative performance of the individual on the uniform and the varied task is needed with careful evaluation of the various types of work to be used in the testing procedure.

The group used in the experiment were all college students to a certain extent, intelligence range was limited. Of the group, however, the intelligence percentile in table 2 reveal that the subjects are distributed widely through the university range. Subjects 2 and 24 are 100 percentile students in the intelligence distribution while subjects 17 and 27 are 9 and 1 percentiles respectively.

The standard deviation approaches very closely to that of the University distribution. This group would hardly approximate the sort of group one might expect to find in an employment office.

All of the tests used in the final

multiple correlation can be said to have a relatively high validity. This is easily demonstrated according to a formula suggested by Kelley (10)

$$r_{tc} = \sqrt{r_{Cc}} \times \sqrt{r_{Tt}} \qquad (1)$$

where

r_{tc} = maximum possible correlation between the criterion and the test
r_{Cc} = the reliability of the criterion
r_{Tt} = the reliability of the test

Inverting the formula it becomes very easy to approximate the minimum possible reliabilities of the tests finally selected. For example, the criterion is composed of 3 heterogeneous factors having reliabilities of .80, .45, and .46 respectively. These were weighted according to the ratios of their squares. The reliability of the criterion would be increased above .8 by the addition of new factors properly weighted. The approximate reliability would then be, using Brown's formula .90 or above as r_{Cc}. If the correlation between test and criterion is .47, then solving the above formula (1) for the reliability of the test:

$$.47 = \sqrt{.90}\,\sqrt{r_{Tt}};\ \sqrt{r_{Tt}} = \sqrt{\frac{.47}{.97}} = \sqrt{.484} = .69 \quad (2)$$

r_{Tt} = .69 as the minimum reliability for the Emotional History Record, and the Production Decrement Difference on the Punch. The reliability for the Production Decrement Difference and Cancellation is at least .635.

SUMMARY

This study has approached the problem of susceptibility to uniformity in a new way which promises to throw considerable light on the general problem. Susceptibility to monotony has been defined as an attitude or "act" distinct from either intelligence or special capacity. An attitude, as defined, is a group of conditioned visceral habits which are capable of modifying the person's behavior regardless of the degree of intelligence or capacity. It is quite apparent that attitudes play a very important rôle in determining whether a person is satisfied in any given situation and contribute in a large measure to all of the problems involved in adjustment.

The factor of susceptibility to monotony was isolated in the present study by means of carefully selected rating scales in which personal information regarding each subject was confidentially secured. These data were further verified by independent ratings made of each subject by carefully selected and trained raters. The composite ratings from the three sources were weighted according to their reliability and combined into the criterion.

The experimental approach consisted in having the subject work at each of the four types of work for two ten minute work periods. These work periods represented the uniform and varied phases of each type of work. Each work period was again subdivided into two halves. Records of production and errors were then recorded for each half of each work period. By dividing the first half of the work period by the second half, the production decrement ratios were obtained for each phase of each type of work. Subtracting the decrement ratios of the varied phase from those of the uniform phase gave the production decrement differences. A similar procedure was followed for the errors except the percentage of errors of the second half of each phase was subtracted from the percentage of errors of the first half. These differences were then subtracted algebraically to give the error decrement differences.

Each production and error decrement difference was then correlated with (1) the criterion; (2) the percentile scores of the Ohio State University Intelligence Test; (3) an Emotional History record; (4) a personal history blank; (5) a modified introvert-extrovert scale; and each one with every other one.

From the table of intercorrelations it was possible to select, weight, and combine these factors giving the maximum prediction of the criterion. The factors selected were (1) Emotional History record, (2) Production decrement difference, for the Punch, (3) production-decrement-difference for Cancellation, and (4) Intelligence. In selecting the above tests additional variables were added until the addition of further tests failed to increase the prediction of the criterion. These when optimally weighted and combined gave a correlation of .71 with the criterion. The next step was to compute the coefficients of partial correlation to determine analytically the intrinsic relationship between the selected factors and the criterion. This procedure revealed which ones were the most important contributors to susceptibility to monotony. The order of importance is the same as the above mentioned order.

Incidentally time estimates were used in the experiment as a further technique. The method of treating the data was essentially the same as that for treating the other data. This part of the experiment showed the unreliability of time estimates as indications of susceptibility to uniformity.

CONCLUSIONS

Monotony is an attitude or "set" which noticeably affects one's adjustment to certain types of work. Monotony or uniformity, is *not* an attribute of any type of work *per se*; it is a conditioned habit system in the individual which to a large degree controls the direction of behavior modification that is possible in that individual.

This study suggests a novel and seemingly valid method of measuring susceptibility to uniformity of work.

From a set of 12 tests, a battery of 4 were finally selected which when optimally weighted and combined gave a correlation of .71 with the criterion (susceptibility to uniformity).

The present study also directs attention to the fact that it is possible to use such instruments as emotional and personal history records to approach problems that have not yielded to other technique.

Estimates of time are unreliable indices of susceptibility to uniformity.

There is evidence that subjects differ to some extent in their susceptibility to uniformity in certain particular types of work. Whether this is a general or specific factor is a problem worthy of further research.

The most important single factor in predicting susceptibility to uniformity was emotional instability as defined in Form I, which gave a correlation of −.46 with the criterion.

Production decrement difference scores were also found about equally effective in predicting the criterion. The decrement ratio for production on the Punch gave a correlation of −.46 with the criterion, and the similar ratio for production on a cancellation test gave a correlation of −.39 with the criterion.

Contrary to all expectations, intelligence was found to play but a minor rôle in determining susceptibility. In general it may be stated that susceptibility to monotony is little influenced by intelligence status.

REFERENCES

(1) BROWN, WM., AND THOMSON, G. H.: *Essentials of Mental Measurement.* Cambridge University Press, rev. ed., 1921.

(2) BURNETT, ISABEL: An Experimental Investigation of Repetitive Work. *Journal of the National Institute of Industrial Psychology*, 1923, II, 16.

(3) BURNETT, ISABEL: *An Experimental Investigation into Repetitive Work.* Industrial Fatigue Research Board, No. 30, London, 1925.

(4) BURTT, H. E.: *Employment Psychology*, Boston: Houghton Mifflin Co., 1926, pp. 568, Chapter X.

(5) CHASSELL, J. O., AND WATSON, C. E.: *An Emotional History Record.* Unpublished.

(6) DUNFORD, RALPH E.: *A Study of Monotony Types.* (M.A. Thesis on File at the Ohio State University Library.)

(7) EDGERTON, H. A., AND PATERSON, D. G.: Table of Standard Errors and Probable Errors of Percentages for Varying Numbers of Cases. *Journal of Applied Psychology*, 1926, X, 3, 378, 391.

(8) FREYD, MAX: Introverts and Extroverts. *Psychological Review*, 1924, 31, 74–87.

(9) KELLEY, T. L.: *Statistical Method.* MacMillan Co., 1923, 369 pp.

(10) KELLEY, T. L.: A Simplified Method of Using Scaled Data for Purposes of Testing. *School and Society*, 1916, IV, 80, 71–82.

(11) KINGSBURY, F. A.: Analyzing Ratings and Training Raters. *Journal of Personnel Research.* 1922, I, 377–383.

(12) KINGSBURY, F. A.: Making Rating Scales Work, *Journal of Personnel Research.* 1925, IV, 1–6.

(13) KORNHAUSER, A. W.: Some Business Applications of a Mental Alertness Test. *Journal of Personnel Research* 1922, I, 103–121.

(14) LAIRD, DONALD A.: How Personalities are Found in Industry. *Industrial Psychology*, 1926, I, 10, 654, 662.

(15) MILES AND SKILLBECK: Experiment on Change of Work. *Journal of the National Institute of Industrial Psychology.* 1926, VI, 236.

(16) MÜNSTERBERG, HUGO: *Psychology and Industrial Efficiency.* Boston, Houghton Mifflin Co., pp. 316. Chapter IX.

(17) MYERS, C. S.: Conceptions of Fatigue and Adaptation. *Psychological Review*, 1925, XXXII, 1, 1–16.

(18) PATERSON, D. G., AND HEIDBREDER, EDNA: Measuring Introversion and Extroversion. *Journal of Abnormal and Social Psychology*, 1926, XXI, 2, 120–134.

(19) ROBINSON, E. S., AND BILLS, A. G.: Two Factors in the Work Decrement. *Journal of Experimental Psychology*, 1925, IX, 6, 1–15.

(20) ROSENOW, C.: The Analysis of Mental Functions. *Psychological Monographs*, 1917, 25, whole no. 106, pp. 43.

(21) TOOPS, HERBERT A.: *Trade Tests in Education.* New York. 1921. Teachers College, Columbia University Contributions to Education, No. 115, 118 pp. Appendix.

(22) TOOPS, HERBERT A.: *Tests for Vocational Guidance of Children.* N. Y. 1923. Teachers College, Columbia University, Contributions to Education. No. 136. 159 pp. Appendix.

(23) WATSON, JOHN B.: The Unverbalized in Human Behavior. *Psychological Review,* 1924, XXXI, I, 273–280.

(24) WYATT, S.: The Effect of Changes in Activity. *Industrial Fatigue Research Board.* No. 26. London, 1924.

(25) WYATT, S.: An Experimental Study of Repetitive Work. *British Journal of Psychology,* 1927, XVII, 3, 192–209.

(26) WYATT, S.: Monotony. *Journal of the National Institute of Industrial Psychology,* 1924, II, p. 24–28.

(27) WYATT, S., AND FRASER, J. A.: The Comparative Effects of Variety and Uniformity in Work, British Industrial Fatigue Research Board, Report No. 52. 1928.

(28) WYATT, S.: Boredom in Industry. *Personnel Journal,* 1929, VIII, 3, 161–171.

(29) YULE, G. UDNY: *Introduction to the Theory of Statistics.* Philadelphia, J. B. Lippincott, 1924, 415 pp.

Measuring Labor Turnover

A Report of Progress

By William A. Berridge, *Metropolitan Life Insurance Company*

The social and economic wastes entailed in excessive hiring and firing are being steadily reduced as management gains insight into the complexities of the situation. Measurement, as Dr. Berridge reminds us, is pre-requisite to accurate understanding. Whether ones' concern is with behavior of electrons, size of spiral nebulae, or fluctuations of the labor market, he needs some scale of units, a suitably calibrated measuring stick, by means of which to make quantitative comparisons. Such standards, for use in measuring five significant aspects of a company's labor turnover, are found in the indexes here described.

The nation's business is indebted to Dr. Berridge and to the Metropolitan Life Insurance Company for having developed these measures and made them available monthly during the past four years; and to the Secretary of Labor and Commissioner Stewart, Chief of the U. S. Bureau of Labor Statistics, for having undertaken to carry forward this service.

A continuation of two earlier reports on the labor turnover problem is herein presented as a résumé of a project in measurement experimentally undertaken in 1926 by the Metropolitan Life Insurance Company. Indexes of labor turnover in 350 companies over a period of ten years are given in tabular and graphic forms. Labor turnover is not considered as a homogeneous entity capable of expression as a formula but, rather, as composed of its several significant elements: voluntary separations, discharges, layoffs, and accessions. Assigned definitions were not given these components of turnover, but the data available under these headings assembled by the coöperating companies were used. Comparability of data progressively improved as employers receiving the service in increasing numbers became aware of the value of the indexes. The median was used as the measure of central tendency of the rates. In the past five years the average accession rate for the 350 companies is 4 per cent. The voluntary quit rate is 2.5 per cent; that is, voluntary quits constitute about three fourths of all separations; while discharges and layoffs contribute ½ of one per cent each to the 3½ per cent total separation rate. The use of the index curves as a barometer of economic conditions is suggested: the lower levels and narrower ranges of the variables since 1924 seem to indicate the stabilization of prosperity reflected in other economic indexes.

On two earlier occasions,[1] in 1925 and in 1927, the writer submitted to readers in this JOURNAL certain observations on the labor turnover problem. Special attention was given to measurement, on the ground that this seems an essential pre-requisite to scientific handling of labor turnover, as of problems generally—in management and in economics as in the physical sciences. Two specific projects of labor turnover measurement were discussed: one inaugurated in May 1925 by the Business Research Bureau of Brown University, the other in January 1926 by the Policyholders' Service Bureau of the Metropolitan Life Insurance Company. Both were concerned with factory labor turnover indexes constructed by the present writer—who, while no longer a member of either Bureau, has been asked by the Editor to bring this series of technical descriptions down to date.

This is an opportune moment for recapitulating the Metropolitan's project, since it has recently completed the experimental stage and has thereupon been transferred (as of July 1, 1929) to the United States Bureau of Labor Statistics. It may be said in passing, however, that the Company will continue its experimental work in other portions of the labor turnover and related fields, carrying on the contact work and the applications of the research to personnel management, through its Policyholders' Service Bureau as heretofore.[2]

Without question, our observation has shown that in recent years factory managers in large numbers are coming to realize more clearly than ever before the importance of labor turnover as a managerial problem—one which is usually not only wasteful and expensive, but also in large part controllable. The increase of interest in this problem, as in most others during the history of management, has many roots, rather then a single one. Among those most important in the present case are the following:

1. The principles and practice of business budgeting, which now has a strong hold in the fields of finance, sales, and production, and in conjunction with these is beginning to be thought out in terms of labor budgeting also.
2. Enhanced interest in functional organization, which is bringing about a concentrated study of all functions relating to labor control as one of the important specialized functions of management.
3. An improved spirit in industrial relations, which is leading many employers to make the most sincere and whole-hearted efforts for conserving employee good-will, but nevertheless is failing to keep turnover from periodically increasing.
4. The high level at which wage rates have been virtually stabilized during the past few years—thereby enhancing the financial loss involved through the departure of trained workmen.

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[1] JOURNAL OF PERSONNEL RESEARCH, Vol. 4, 166–172; and PERSONNEL JOURNAL, Vol. 6, 1–14.

[2] Mr. Lloyd R. Miller of the Policyholders' Service Bureau has largely handled both of those functions in connection with the project herein described, the present writer's function being merely a technical one relative to the statistical and economic questions involved.

5. Recent disclosures of new evidence on the extent and fluctuation of labor turnover, so marshaled as to permit striking comparisons to be made between a company's internal experience and the more general experience of others, and to suggest the need for executive action.

COÖPERATING COMPANIES AND AGENCIES

The indexes hereinafter described currently represent data from about 350 manufacturers, with work forces aggregating about 600,000 on the average. Toward the early part of the period 1919–1929, the representation is of course smaller, being dependent upon the availability of back records; but for none of the variables used have we sponsored a composite without careful scrutiny and test.

Only about 100 companies have lately been reporting to the Metropolitan directly. The other 250 report to various local agencies which have from time to time indicated a desire to coöperate in this manner, and which have received from us (by permission of the companies concerned) such records as we had assembled at the time from manufacturers located in their respective areas. These agencies also collect data from other manufacturers than the 250, but we have refrained from incorporating them all indiscriminately into the national indexes, in order to avoid undue weighting of certain localities or certain industries. Perhaps three times as many manufacturers are reporting on labor turnover experience each month to some office or other as are incorporated in the 350-company indexes.

The coöperating agencies return to each of their reporting companies, each month, a sheet on which are given the particular company's turnover rates (as defined below) and the corresponding set of average rates for the entire area;[3] the sheet also carries the Metropolitan's national averages in a third column. The Metropolitan too has done this since the inauguration of the project, except that it has never considered it practicable to subdivide its national sample into a whole set of local groups; the number of companies would hardly have been adequate.

The number of such coöperating agencies has grown until, on July 1, 1929, it amounted to thirteen:

Associated Industries of Massachusetts
Brooklyn Chamber of Commerce
Brown University
Connecticut Industrial Council
Employer's Association of New Haven
Illinois Industrial Commission
Indiana University
Manufacturers' Association of the City of Bridgeport
Manufacturers' Association of Meriden
Ohio State University
Rutgers University
University of Denver
University of Michigan

THE PROBLEM OF FORMULA

Some readers may regard it as rank heresy for anyone to maintain that there is no one formula, or one best formula, for "*the* labor turnover;" yet such our view has been—and is.

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[3] Some agencies are also showing a set of average rates for particular industrial groups within their areas.

We have recognized, of course, that a multiplicity of such formulas exists. The commonest among them is perhaps the ratio of total separations to mean number on payroll, that ratio being converted by multiplier to an equivalent annual basis. Some authorities have proposed the replacement rate; and diverse other proposals are on record in the voluminous literature on labor turnover.

Virtually the only point upon which we have insisted is that students of the labor turnover problem should resort to the first principles of *a priori* logic and of empirical statistical testing, in the light of which we have believed they would accept these theses: (1) that the total separation rate, despite its admitted usefulness, is not a homogeneous but a highly heterogeneous phenomenon; (2) that to be rendered intelligible it has to be resolved into its several constituents—voluntary quitting rate, discharge rate, and layoff rate; (3) that these three single constituents, (and the accession rate also) have value, each in its own right; and finally (4) that these may serve not only as measures of labor turnover experience *per se*, but also as useful, significant reflectors of economic or general labor market conditions when thrown into statistically suitable form.

We have been asking our reporting manufacturers simply to send in the following items each month, indicating whether they cover a four-week, five-week, or calendar-month period; it was found impracticable to call for the replacement item, desirable though that would have been:

1. Total Hirings (including re-hirings)
2. Total Separations
    (a) Voluntary Quits (excluding those involved in any labor disputes)
    (b) Discharges
    (c) Layoffs
3. Number on payroll (usually the average of the number at beginning and at end of month).
4. Remarks on any special situation affecting the Company's figures for the report period.

We have adhered to number on payroll in preference to number at work as the denominator for all rates—not only because easier to obtain but also because we deem it an intrinsically better measure of exposure, in general.

MUST TERMS BE RIGIDLY DEFINED?

Perhaps quite as heretical as our rejection of the one-formula idea is another view to which we have come: that a pre-arranged set of completely leak-proof definitions of voluntary quits, discharges, etc., to which all reporting companies must conform, is not vital. If it had been expedient to get such a set fairly widely adopted in advance, it would have been desirable; but it certainly was not expedient, and, fortunately, it did not prove necessary. All of the turnover variables concerned fluctuate so widely over a period of time that even a rather rough comparability of practice as to definition was sufficient to bring out striking conclusions as to the behavior of general turnover experience of manufacturers from first-approximation indexes, in relation to certain economic indexes derived from other sources. And the establishment of these conclusions, coupled with the increasing desire of employers to make the most precise comparisons possible between the general curves and the corresponding data for their respective plants, obviously set up incentives which tended to bring about progressively greater comparability in the definitions employed by the reporting manufacturers.

To have brought about as much comparability as this in advance, without the advantage of such incentives, would have been almost hopeless, if one may judge from the outcome of endeavors of that sort previously made elsewhere. However, we wish to point out that the unanimity as to definitions is still not complete. The United States Bureau of Labor Statistics will doubtless succeed in making further advances to that end.

FORM OF AVERAGE USED IN RATE COMBINING

After considerable experimenting, the form of average which we adopted was the unweighted median of all the quit-rates, of all the layoff rates, etc.[4] The median, it will be recalled, is the central item of an array whose items have been arranged in order of magnitude. Thus, to take an extremely simple case, the five items, 1.3, 4.5, 0.2, 15.7, and 1.9, are seen (when they are arranged according to magnitude, 15.7, 4.5, 1.9, 1.3, and 0.2) to have 1.9 as their median.

The employment of the median in this type of personnel analysis is not usual, and requires justification. There are two main reasons for its use here. One is the ease with which it is determined. The other and more important reason is that the median seems to provide the soundest central tendency from which to measure deviations of an individual company's experience, since it largely avoids the danger of overweighting any extremly *large* (*or small*) *company* present in the group, and also that of overweighting the extremely *high* (*or low*) *rate* experienced by a reporting company. Detailed evidence on these points need not be recited here, as it is already on record elsewhere.[5]

The unweighted median tends to avoid both of these dangers, since (1) it is drawn from the array of the *rates* experienced by the individual companies irrespective of size of the company, and (2) it is determined by the mere *position* of the central rate, and is therefore independent of the actual size of those exceptional rates lying at or near the outer extremes. Extensive tests have shown that the unweighted arithmetic mean, for example, would have been very sensitive to extreme items, especially to extremely *high* rates—and of these there are many, for we find considerable "upward dispersion." For quit rates, the arithmetic average was found to exceed the median quit rate, in general, by one-third to one-fifth the size of the latter, during a test period of nearly eight years.[6]

Consideration of these facts has led us to the adoption of the median in preference to other measures of central tendency, for studying the general course of time series representing the several constituents of labor turnover.

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[4] For the total separation rate, the sum of the three component medians was used.

[5] This Journal, volume VI, page 6 *et seq.*

[6] This Journal, volume VI, pages 7–9, text and figures 2 and 3.

COURSE OF INDEXES

During the past five years, the accession rate has averaged about 4 per cent per month, the total separation rate 3½ per cent, the layoff and the discharge rates ½ of 1 per cent each, and the voluntary quit rate 2½ per cent, or about three-fourths of all separations. Of course the variables have fluctuated considerably above and below their respective averages for these five years, and in the preceding five (1919–1923) fluctuated over a still wider range.

Four of the variables yielded by this study—accessions, layoffs, voluntary quit, and discharge rates—are presented graphically for the entire period back to January 1919, by months, in figure 1 and figure 2. These four, and the total separation rate also, are shown in tabular form at the end of this article. In both places, the rates are shown on the basis of the "standard month;" in other words, the variations in lengths of the several calendar months and of company report periods are all eliminated, so that the point plotted for any month whatever is exactly one-twelfth of the "equivalent annual rate" prevailing in that month. It should be noted (at the left and right of the figures) that each of the four variables is charted on a statistical scale different from each of the others, in order to disclose more clearly the fluctuations and course of the discharge and the layoff rates, which, of course, would have been less easy to read if charted on the same scale as accessions or even voluntary quits.

Let us consider first the significance of the data in figure 1. On account of the tremendous boom of 1919–1920, the accession rate (full line) was high, reaching and even exceeding 16 per cent per month at some points in the period. For a similar reason, the layoff rate (dotted line) fell rapidly to the vanishing point, and remained low until the last few months of 1920. In 1921, business depression caused accessions to fall to 2 or 3 per cent per month; layoff rates correspondingly rose, averaging about 2 per cent per month during 1921 as a whole, and reaching twice that figure in one month of the year. Since then, each of the curves has responded to the cycle of economic and industrial conditions in much the same general manner as it had before—but each within a much narrower range from high to low.

Of the second pair of variables, the voluntary quit rate (full line) mounted very high (to 10 per cent per month and more) in 1920, partly because workers found it easy to better themselves by resigning to take other jobs, which were very plentiful, and partly because (with high accession rates—compare figure 1) work forces were becoming diluted with large numbers of short-service employees, who of course have a characteristically poor persistency. Other factors also had some influence, but these two were the most important.

Conversely, quits fell sharply in the 1921 depression, to an average of about 2 per cent per month. Discharges (dotted line) showed nearly the same general behavior as voluntary quits,

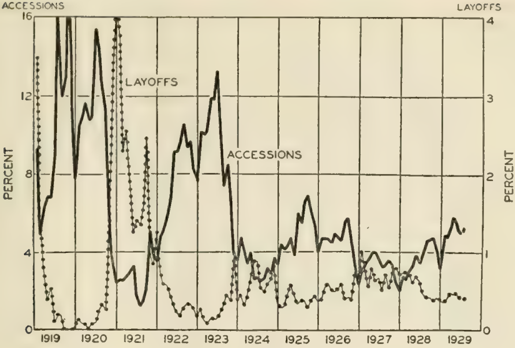

FIG. 1. ACCESSION AND LAYOFF RATES IN FACTORIES
Adjusted to Standard Month

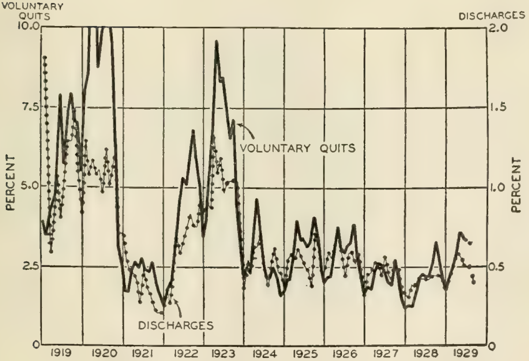

FIG. 2. VOLUNTARY QUIT AND DISCHARGE RATES
Adjusted to Standard Month

rising in the boom and falling in the depression period. These two curves, like those of figure 1, have since 1921 responded to economic conditions in a manner similar to their responses before that time—but not in such a violent manner in the later years.

The fact that all of these curves have in the latter half of the post-war period fluctuated within narrower ranges, and on lower levels, than in the first half of the period is of course no indication of lesser industrial activity and prosperity but rather a more sane and stable prosperity. The stabilization movement has influenced personnel management as it has production and other management fields. Our impression is that a more conservative policy is leading industrial executives to hire or fire or lay off in more orderly fashion rather than in "fits and starts" as they formerly did; this naturally reflects itself also in reduced counterbidding for labor and therefore lower quitting rates. Although the spread of the stabilization idea is probably not the sole cause, we believe it to be the chief cause of the lower levels and narrower ranges which have characterized all the turnover variables since 1924.

(*Manuscript received July 20, 1929.*)

TABLE 1

Accession rates

(Standard month)

	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
January	9.5	10.6	2.6	4.9	10.4	4.9	4.5	4.8	3.1	2.8	5.0
February	4.5	10.4	2.3	4.8	9.3	3.9	3.8	4.3	3.2	2.5	4.7
March	6.3	11.9	2.7	5.9	10.4	3.4	4.4	4.8	3.7	3.0	5.1
April	6.8	10.6	2.9	6.5	11.7	3.9	4.6	4.3	3.9	3.3	5.9
May	7.0	11.2	3.3	9.3	12.0	2.7	3.9	5.1	4.1	4.0	5.0
June	9.1	15.3	1.8	9.0	13.0	2.7	5.9	4.7	3.7	3.5	5.1
July	17.0	14.7	1.2	10.0	11.3	2.6	5.5	4.6	3.2	4.0	5.1
August	12.1	12.7	1.5	10.8	7.4	2.7	6.7	5.6	3.4	4.7	4.2
September	12.8	11.2	2.1	9.2	8.4	3.1	6.9	5.7	3.6	4.7	
October	18.5	7.0	5.2	10.0	6.8	2.8	6.2	4.9	3.5	4.8	
November	10.2	3.6	3.9	8.2	4.0	3.6	5.4	3.3	2.6	4.1	
December	0.9	2.5	3.5	7.7	3.4	3.4	4.0	2.3	2.0	3.2	

TABLE 2

Total separation rates (sum of quits, discharges and layoffs)

(Standard month)

	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
January	9.4	9.7	6.3	2.8	5.4	3.7	3.1	3.3	3.5	2.3	3.1
February	5.9	9.3	4.1	2.5	6.4	2.9	2.8	3.1	2.8	2.2	3.5
March	5.7	13.2	5.6	3.4	8.7	4.9	4.1	4.3	3.5	2.8	4.1
April	5.7	12.8	4.9	4.2	10.7	5.9	5.2	5.0	4.0	3.1	4.6
May	6.5	10.1	4.1	5.6	9.8	5.2	4.5	4.3	3.7	3.5	4.5
June	8.7	10.7	4.7	6.2	9.4	3.9	4.2	3.8	3.7	3.2	4.2
July	7.1	11.9	4.3	6.2	9.1	3.2	4.1	4.5	3.1	3.2	3.8
August	9.0	12.0	4.3	7.1	8.0	3.3	4.2	4.4	3.1	3.5	3.8
September	9.2	10.7	5.3	7.8	8.6	3.7	5.1	4.8	3.7	4.1	
October	8.7	8.7	3.3	7.0	6.1	3.4	4.6	3.7	3.5	3.5	
November	8.0	6.9	2.7	6.2	4.7	2.9	3.4	3.3	2.6	2.9	
December	6.4	7.3	2.9	4.5	3.0	2.5	3.0	2.6	2.3	2.5	

TABLE 3

Voluntary quit rates

(Standard month)

	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
January	4.0	8.2	1.8	1.6	4.1	2.6	2.2	2.3	2.0	1.3	2.3
February	3.2	8.2	1.6	1.8	5.5	2.2	2.0	2.1	1.7	1.2	2.6
March	4.3	11.9	2.5	2.2	7.2	3.8	3.0	3.0	2.5	1.7	3.1
April	4.5	11.7	2.7	3.0	9.5	4.7	4.0	3.8	2.7	2.1	3.6
May	4.9	8.9	2.5	4.7	8.5	3.6	3.4	3.2	2.7	2.4	3.5
June	7.8	9.7	2.8	5.3	8.4	2.5	3.4	2.9	2.4	2.2	3.2
July	5.8	10.4	2.5	5.2	7.8	2.2	3.2	3.3	2.1	2.3	3.0
August	7.5	10.7	2.4	6.0	6.6	2.2	3.4	3.4	2.0	2.7	2.9
September	7.9	9.4	2.7	6.8	7.1	2.5	4.1	3.9	2.7	3.3	
October	7.2	6.1	2.1	5.9	4.6	2.3	3.6	2.7	2.2	2.7	
November	6.9	3.2	1.7	5.0	3.1	1.6	2.5	2.1	1.5	2.1	
December	5.6	2.5	1.4	3.5	2.2	1.8	2.1	1.7	1.3	1.7	

TABLE 4

Discharge rates

(Standard month)

	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
January	1.9	1.4	0.6	0.4	1.0	0.6	0.6	0.6	0.5	0.3	0.4
February	1.2	1.0	0.4	0.2	0.8	0.4	0.5	0.5	0.4	0.4	0.5
March	0.6	1.2	0.5	0.6	1.4	0.6	0.6	0.7	0.5	0.4	0.6
April	0.8	1.1	0.4	0.7	1.1	0.6	0.6	0.7	0.5	0.4	0.6
May	1.1	1.1	0.3	0.6	1.2	0.7	0.6	0.6	0.4	0.4	0.5
June	0.8	0.9	0.5	0.7	0.9	0.5	0.5	0.4	0.6	0.4	0.5
July	1.1	1.3	0.4	0.8	1.1	0.4	0.5	0.6	0.5	0.4	0.4
August	1.3	1.0	0.3	0.8	1.1	0.6	0.4	0.6	0.4	0.4	0.4
September	1.3	1.1	0.2	0.7	1.0	0.6	0.7	0.5	0.5	0.4	
October	1.5	1.3	0.2	0.8	1.1	0.5	0.6	0.6	0.5	0.4	
November	1.1	0.7	0.2	0.9	0.7	0.5	0.5	0.5	0.3	0.4	
December	0.8	0.6	0.2	0.8	0.4	0.4	0.5	0.3	0.3	0.4	

TABLE 5

Layoff rates

(Standard month)

	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
January	3.5	0.1	3.9	0.8	0.3	0.5	0.3	0.4	1.0	0.7	0.4
February	1.5	0.1	2.1	0.5	0.1	0.3	0.3	0.5	0.7	0.6	0.4
March	0.8	0.1	2.6	0.6	0.1	0.5	0.5	0.6	0.5	0.7	0.5
April	0.4	0.0	1.8	0.5	0.1	0.6	0.6	0.5	0.8	0.6	0.5
May	0.5	0.1	1.3	0.3	0.1	0.9	0.5	0.5	0.6	0.7	0.5
June	0.1	0.1	1.4	0.2	0.1	0.9	0.3	0.5	0.7	0.6	0.5
July	0.2	0.2	1.4	0.2	0.2	0.6	0.4	0.6	0.5	0.5	0.4
August	0.2	0.3	1.6	0.3	0.3	0.5	0.4	0.4	0.7	0.4	0.5
September	0.0	0.2	2.4	0.3	0.5	0.6	0.3	0.4	0.5	0.4	
October	0.0	1.3	1.0	0.3	0.4	0.6	0.4	0.4	0.8	0.4	
November	0.0	3.0	0.8	0.3	0.9	0.8	0.4	0.7	0.8	0.4	
December	0.0	4.2	1.3	0.2	0.4	0.3	0.4	0.6	0.7	0.4	

News Notes

PERSONNEL RESEARCH FEDERATION

An unusually interesting and valuable program is to be presented at the Eighth Annual Autumn Conference of the Personnel Research Federation to be held in the Engineering Societies Building, 29 West Thirty-ninth Street, New York, November 15 and 16.

An investigation which has been in progress for over two years at the Western Electric Company in Chicago will be reported and discussed. This is a fundamental study of the psychological and physiological factors affecting the worker and his output. Program speakers include John Dewey, Stuart Chase, and Frances Perkins. Complete details of the meeting will be published in the November Service Bulletin.

PURDUE WABASH CONFERENCE

The Purdue-Wabash Conference of College Personnel Officers with the American Council on Education and the PERSONNEL RESEARCH FEDERATION coöperating, presents an interesting program for each of the two days it convenes.

The sessions on October 28 will be held at Purdue University, Lafayette, Indiana, with J. E. Walters in charge. The talks for that day will be:

"Techniques of College Personnel Work," J. A. Humphreys, Oberlin College.

"College Personnel Methods from the Engineering Viewpoint" A. A. Potter, Purdue University.

"The Program for Austin Scholars," D. T. Howard, Northwestern University.

"Personality Development in the Colleges," Daniel A. Robertson American Council on Education.

"Personality Development as Revealed by Case Studies of Problem Students," E. B. Harper, Kalamazoo College.

"Personnel Procedures in Education," L. B. Hopkins, President, Wabash College.

The schedule of addresses to be held the following day at Wabash College, Crawfordsville includes:

"Technique of College Placement," John D. Beatty, Carnegie Institute of Technology.

"Student Personnel Research," Edward S. Jones, University of Buffalo.

"What Industry and Business Expects of College Personnel Work," General R. I. Rees, American Telephone and Telegraph Company.

"Vocational Guidance in Higher Education," C. S. Yoakum, Northwestern University.

"Techniques of College Personnel Records," R. A. Brotemarkle, University of Pennsylvania.

Actual techniques used in college personnel work,—personality development, placement, vocational guidance, and records will be discussed in detail.

ACTIVITIES OF MEMBER ORGANIZATIONS

Vocational Service for Juniors

The place of a disinterested private organization in securing the improvement of a public service was shown in the success of the movement to create a separate Division for Junior Placement in the New York State Department of Labor. The division started on its career July 1, with Miss Clare L. Lewis, widely experienced in child labor and employment problems, serving as its head. Though the appropriation on which it will have to work for the next twelve months is small, only $20,000, Miss Frances Perkins, Industrial Commissioner, and her appointee Miss Lewis are planning to make the most of every resource and to create a section that will be its own argument for better financial support.

The drive for the separation of the junior and the adult employment service started last fall, when the Vocational Service for Juniors submitted to James A. Hamilton, then Industrial Commissioner, a budgeted plan based on this organization's experience in operating free placement bureaus in Manhattan. This plan called for an annual appropriation of $106,000. It was approved and went with the rest of the Labor Department budget to Albany, where it might have been lost in the shuffle but for the fact that twenty-two civic and welfare groups rallied to its cause.

The Chamber of Commerce of the State of New York passed favorable resolutions and circularized its members. The State Federation of Labor, The Woman's Trade Union League, the Welfare Council of New York City, the State League of Women Voters, the Public Education Association, the State and City Federation of Women's Clubs, the Consumers' League of New York, the Vocational Adjustment Bureau and equally important bodies gave vigorous backing. They did not prevent the cut in the appropriation, but at least the proposition lived and went through.

Miss Perkins and Miss Lewis intend to utilize this general interest to eke out the insufficiencies of the staff. Only five new counselors can be engaged, and the division includes thirteen employment offices situated in continuation schools in Albany, Buffalo, Syracuse, Rochester and New York City. The present workers will be retained, but as these offices have been operated as part of the adult service, with little attempt to deal with the junior job-hunters as a special problem, a great deal of reörganization and training will be necessary. Consequently one of Miss Lewis's immediate tasks will be to form advisory committees in each city, composed of local industrial, labor and welfare leaders, whose coöperation is expected to help steer the new division.

For a number of years Miss Lewis has been head employment counselor for the Vocational Service for Juniors, stationed at its placement bureau in the West Side Continuation School, and she will use this as a training school for the State workers. The methods she developed here she will carry into her new work. Every boy or girl who applies for a job will receive individual attention. Those who do not need to work, who left school from restlessness or dissatisfaction with the subjects they were forced to study, will be urged to return and get more education, and the counselor's influence will be used to shift the maladjusted into the right classes.

Those who must work will be provided with the best available jobs, and every place to which a child is sent to work will be visited beforehand. The task the new Division faces is large for the combined registration of the continuation schools where State employment offices are operated is over 65,000, and the number of children who leave school each year to take out working papers is very large.

Boston Elevated Railway

For the eighth successive year the Boston Elevated Railway offers to its employees a series of educational courses. The programs have been selected yearly by a committee of executives representing all divisions of the utility. This committee has announced as its choice for the 1929–1930 season "those courses which have proven popular." The first class for employees sponsored by the company was in practical electricity. From this beginning in 1922, there has been developed through interest manifested in voluntary and sustained attendance the following significant curriculum available during the current term:

Transportation Problems
Principles of Investment
Accident Prevention
Supervised Reading
Selling Car-rides
Practical Supervisory Problems
Foremen Conferences: Discussion Groups for Supervisors
Boston Elevated Forum: for the Discussion of Departmental Problems
Public Speaking;

and particularly for women employees

Arts and Crafts
Home Nursing and First Aid
Secretarial Course

National Committee for Mental Hygiene

Progress is being made in the organization of The First International Congress on Mental Hygiene, to be held in Washington, D. C., May 5–10, 1930. Educators, psychiatrists, other physicians, public officials, social workers, industrialists and many others from all over the world are expected to be present when the Congress convenes.

Herbert C. Hoover has honored the Congress by accepting the position of honorary president. Already twenty-six countries are represented on the Committee on Organization, of which Dr. Authur H. Ruggles, of Providence, R. I., is chairman. Dr. William A. White, of Washington, D. C., is president of the Congress, and Clifford W. Beers is Secretary-General. The Congress is being sponsored by mental hygiene and related organizations in many countries.

Questions to be discussed at the Congress will include the relations of mental hygiene to law, to hospitals, to education, industry, social work, delinquency, parenthood and community problems. A world-wide view of mental hygiene progress will be given. The subject will be discussed also in specific application to the maladjustment problems of individuals, special attention being probably given to childhood, adolescence and later youth. It is the contention of those promoting the Congress that mental hygiene has to do with the conservation of mental health in general, not merely with nervous and mental diseases. The point of view of clinical diagnosis and treatment will be considered, as well as that of administration of institutions and agencies.

Basic expenses of the Congress are being underwritten by the recently organized American Foundation for Mental Hygiene. Opportunity will be afforded for acquaintance among delegates of the various countries, and translations, together with other conveniences, will facilitate comprehension of all that may be said in unfamiliar languages. Administrative headquarters have been opened at 370 Seventh Ave., New York City, where John R. Shillady, Administrative Secretary, is in charge. A membership fee of $5 (including the Proceedings) has been fixed.

American Federation of Labor

Principal among the subjects discussed at the Annual meeting of the American Federation of Labor in Toronto were: Injunctions, low standard of wages in certain industries, unemployment caused by the introduction of new production processes, and the discharge of workers over forty-five.

William Green, Frank Morrison, and Martin F. Ryan were unanimously reëlected as President, Secretary and Treasurer, respectively of the organization. Boston was selected as the location for the next convention.

I. R. I.

A preliminary informal report of the conference of the International Industrial Relations Association (I. R. I.) held at Schloss Elmau, Oberbayen, Germany, this summer as been received. Sixty-three representatives from fifteen different countries attended. The subject of discussion was methods of promoting satisfactory human relations in industry which is rationalized or scientifically managed. The report gives this summary of the conference:

"Every section of industrial thought and experience was included—production managers, research workers, employers and employees. These were brought together by their keen interest in the world-wide need for raising the standard of life by increased production and wider distribution of goods and services.

"Rationalization under various forms and names held the central place in discussion and the fear of unemployment as a consequence of rationalization was evident on the employees' side. Scientific management was described in the widest possible sense, based on the best practice in Europe and the United States, as that management which would best coördinate all activities in the workshops and in an industry to the end of producing goods and services with the least waste of human effort and material resources. The evils which experience showed have followed from various systems of intensifying labour and increasing speed were shown to be due to misunderstood and misapplied methods of management, which are not truly scientific. It was pointed out that the economic crisis in which all industrial countries are more or less involved can only be met by a fuller application of science to industrial problems. Higher standards of life protected against unemployment and insecurity, which is at present found in all countries, can only be attained by a thorough-going application of technical skill combined with understanding of human relations."

AMERICAN STANDARDS ASSOCIATION

A movement that inevitably will be reflected in future industrial personnel activities,—particularly in the techniques of employee selection and training—is the recent drive inaugurated by the American Standards Association for national industrial standardization. Control of national standardization policies has been for the past ten years in the hands of engineers and scientists who directed the activities of the American Engineering Standards Committee,—organized in 1918. The interest of industrial executives,—aware of the vast savings to be made through standardization—in the work of the Committee led to its reorganization in November, 1928, at which time the name of this national federation of technical, trade, and industrial organizations was changed to the American Standards Association. The final step in this administrative reorganization was the appointment this month of the following twelve first line executives representing nine major industries as the Association's first Board of Directors: Quincy Bent; George Burgess; Cloyd Chapman; C. L. Collens; Howard Coonley; L. A. Downs; Bancroft Gherardi; F. E. Moskovics; W. J. Serrill; C. E. Skinner; M. S. Sloan; R. J. Sullivan. The official announcement of the personnel of the Board contains this statement, signed by J. A. Farrell, Chairman of the Advisory Committee: "The participation of trade and technical associations in the direction of the Association's activities, and of industrial and business leaders in carrying on its work is highly desirable."

THE AUSTRALIAN INSTITUTE OF INDUSTRIAL PSYCHOLOGY

The Australian Institute of Industrial Psychology has issued its annual report for 1928–1929,—the second year of its existence. Progress is reported in "the application of the methods and discoveries of science to problems of industrial and business life." The activities during the year included the installation of a testing service for the purpose of vocational guidance; the standardization of a series of office tests; a survey of occupations for juniors; and investigations of secondary educational facilities in business and salesmanship. Projects in the application of Industrial Psychology to business were carried on in a department store, a municipal office, and in a business college. With a small staff, in a small country this young Institute is to be congratulated on its achievements, as is the Chamber of Manufacturers "which," as the report states, "continues to afford the valuable assistance so indispensable in the early days of an Institute."

TO STUDY PUBLIC EMPLOYMENT BUREAUS

Frances Perkins, Industrial Commissioner of the State of New York has announced the appointment of a committee to study the public employment agencies maintained in New York City by the State of New York.

The committee is to supervise the study, and will be composed of: Glenn Bowers, Stuart Chase, J. Byron Deacon, William Hodson, Sam A. Lewisohn, F. A. Silcox, John Sullivan, and Leo Wollman. Mr. Lewisohn represents the Merchant's Association; Mr. Chase, the Labor Bureau, Inc.: Mr. Wollman, the Amalgamated Clothing Workers, and Mr. Sullivan, the State Federation of Labor.

Miss Mary LaDame, formerly of the Russell Sage Foundation will do the actual work. The study is being undertaken, said Miss Perkins because "of the feeling that while we have a pretty good public employment service in this State, this service ought to be a great deal better."

"The survey," she continued, "will go into such matters as the suitability of the present location of the State's employment offices, with reference to the industries served; the layout of the office with reference to the applicants served; the privacy of the interview, and the avoidance of crowding. It will also go into the entire field of personnel, examining the duties and salaries of persons in the service for the last ten years and comparing salaries to those of equivalent positions in private agencies.

"The relative demand for men, women and young workers will be examined, as will the racial and national distribution of applicants, the reception afforded different classes of applicants, and the method of keeping in touch with applicants. The method of interviewing applicants and the extent to which interviewers visit employers and familiarize themselves with actual working conditions will be studied.

"All the forms, records and files of the public employment offices will be examined, the procedure of the public employment offices in industrial disputes looked into, and the opinions of employers and labor organizations on the usefulness of New Yord City offices obtained and analyzed."

EIGHTEENTH ANNUAL SAFETY CONGRESS

The responsibility of the city and the community in accident prevention was a heavily emphasized theme running through the proceedings of the Eighteenth Annual Safety Congress which was held in Chicago, September 30 to October 4, 1929. National experts reported on the most modern practical methods in city-wide coöperation in the lessening of traffic, home, and school accidents. Seven thousand delegates and guests were in attendance at the Congress. Safety engineers, civic, industrial, and educational leaders made up the roster of the three hundred fifty speakers on the program of the Congress. The 125 sessions included 27 Industrial Divisions devoted to specific safety problems in as many different industries; and, in addition six special industrial divisions covered the field of Industrial Health and Industrial Nursing. The exhibition of safety appliances and educational devices was the most complete ever displayed at a congress.

RELIGIOUS EDUCATION ASSOCIATION CONFERENCE

The Second Annual Conference on Research of the Religious Education Association was held September 27–29 at the Chicago Theological Seminary.

With a view to securing a continuous and cumulative series of discussions under optimal conditions, the number of invited participants were limited to thirty-five, from such fields as education, psychology, psychiatry, sociology, religion and religious education.

Seven sessions were held. Guided by the experience of the conference of 1928 and the expressed opinions of those who attended, it was decided to have no set papers but to organize carefully planned round tables on the following topics under the leaders named:

1. Instruments of Research, L. L. Thurstone.
2. Life History and Case History Methods, E. W. Burgess.
3. Controlled Experiments, John E. Anderson.
4. Methods in Community Study, Arthur L. Swift, Jr.
5. Methods and Instruments in Curriculum Research, Ernest Horn.
6. Bases for Present Standards of Value, S. A. Courtis.

The final session was reserved for a summary of the conference,—a stock-taking. Here the attempt was made to formulate the promising fields and projects of research which might be undertaken.

PUBLIC EMPLOYMENT SERVICES CONVENTION

The International Association of Public Employment Services of the United States and Canada held last month in Philadelphia its seventeenth annual convention. Twenty-three of the States, and seven Canadian provinces were officially represented as well as the federal governments of the two countries. Many addresses followed by discussion were delivered on various subjects relating to employment. The readjustment of employees displaced by labor-saving machinery, and the agitation for a more definite clearing house whereby workers can be more readily moved from places of unemployment to other locations where their services are in demand were major topics considered. In order that the purposes of the organization may be better accomplished the association hopes for a larger representation from industrial corporations at its next convention, which will be held September 1930, in Toronto.

AMERICAN MANAGEMENT ASSOCIATION

Seven of the nine general topics announced for discussion at the Autumn Convention of the American Management Association concern personnel problems. Executives from representative industrial and commercial firms will present papers on

Compensation of Executives
Research Activities of Companies
Pensions
Employee Training
Executive Training Program
Measuring, Standardizing, and Compensating for Office Operations
Branch Office Management

The Convention meets at the Hotel Statler in Detroit, October 29, 30, 31, and November 1, 1929. The complete program may be secured from the Association's headquarters: 20 Vesey Street, New York.

NEW YORK UNIVERSITY

The School of Education in coöperation with The National Junior Personnel Service is offering for the current academic year a series of courses on Counseling, Guidance, and Personnel Service, for Educational and Vocational Counselors, Advisers of Boys and Girls, Deans of Men and Women, Club Leaders, Social Workers, Teachers, School Administrators, and others interested in the personnel problems of youth.

The courses deal with all phases of counseling—educational counseling which carries over into the adult field and counseling for vocational guidance.

New courses offered for the first time in the academic year 1929–1930 include: Character Guidance, Placement, Principles and Practices for Continuation and Other School Officials, Personnel Responsibilities for Training and Education in Business; Women in Business, Industry and the Professions, and Labor Problems in their Relation to Vocational Counseling.

PERSONAL ITEMS

The PERSONNEL JOURNAL is fortunate in having secured Dr. DOUGLAS FRYER, Chairman of the Department of Psychology, New York University, as its Book Review Editor. Dr. Fryer takes over the responsibility with this issue: evidences of the new directorship can be noted in some slight modifications in the make-up of the section.

CLARENCE S. YOAKUM has been appointed Dean of the College of Liberal Arts at Northwestern University.

The personnel and training division of the Procter and Gamble Company has acquired two men prominent in personnel research activities: H. E. BERGEN, formerly Personnel Director for the Henry L. Doherty Company, New York, and W. E. PARKER from the faculty of the University of Michigan.

Book Reviews

PERSONNEL PLANS TRIED

Labor Policies of the National Association of Manufacturers. University of Illinois Studies in the Social Sciences, March, 1927. By Albert Guilford Taylor. Urbana: University of Illinois, 1928. Pp. 184.

Supplemental bonuses for wage workers, supervisors and executives. National Industrial Conference Board. New York: Author, 1927. Pp. 57.

Classification and compensation plans. Civil Service assembly of the United States and Canada and the Bureau of Public Personnel Administration. Washington, D. C.: Author, 1928. Pp. 24.

Foreman training. By George F. Mellen. New York: McGraw Hill Book Company, 1928. Pp. 58.

Reviewed by Arthur Howard Sutherland

This group of fact finding studies covers several fields—labor policies, methods of payment and foreman training.

The study by Mr. Taylor is not an attempt to evaluate the usefulness of the organization. He devotes himself to one of its activities and attempts to treat this segment of work descriptively. The study of supplemental bonuses will be of interest to all corporations and personnel departments which have been experimenting or hoping to experiment with incentives. A short chapter is devoted to estimates of the purposes and to the success of the various plans. The study by the Civil Service Assembly is theoretical and proposes a guide to dealing with positions. The foreman training principals are the result of conferences with foremen and executives during a number of years and is compiled and condensed to provide the backbone of a course of training for other foremen. This study is general in character and must be reapplied to a specific situation which the reader may be more familiar with.

The National Association of Manufacturers was organized in 1896 to promote foreign trade, to foster commercial education, but without a labor policy. Six years later it formally inaugurated a militant policy of opposition to labor unions and their organized attempts to advance their own interests.

In more recent years these policies have been reformulated and are now described as an effort to promote public progress and general prosperity. Likewise The American Federation of Labor takes the stand that it is the protector of the peoples' interests. Thus though there is harmony in the formulation of purposes, the policies are strikingly opposed. The Manufacturers Association opposes unionism and would exterminate the system. It is built upon the idea that the employers' interests are also those of society in general, including the working class members.

The Association conducts propaganda through the schools, the church, the press, and by other means. It endorses and condemns party candidates, conducts lobbies and bids for public support through its advocacy of certain humanitarian and social measures. In the view of the author of this monograph, this is not always consistently done. He estimates that the most significant result of the work of the Association has been its influence upon legislation.

In the report upon *Supplemental Bonuses for Wage Earners, Supervisors and Executives* it is shown that wage earners in 107 companies, to the number of 135,228, participated in bonus plans based on regularity of attendance, length of service, improvement of quality, prevention of waste, reduction of costs, prevention of accidents, shipments and general merit. Amounts of bonus varied from three cents per hour to 10 per cent of wages. In 17 companies employing 5000, the average expenditure in bonuses amounted to approximately $75, or 5 per cent of the annual earnings. Employers vary in their estimates of the value of the plans.

In 77 establishments, supervisory employees draw bonuses for such additional items as maintenance of schedule, suggestions, arrangement of department, earnings of department, record of sales and costs compared with investment. Payment varies from a single annual payment to smaller payments in cash at each pay period. In a few cases payment is made in stock.

In thirty-three companies studied, executives draw bonuses for general merit, savings between budgeted and actual expenses, increased sales, conspicuous service, increased profits above quota, decrease in defective product, and general factors such as operating ratio, satisfactory personnel relations, etc.

Various civil service practices and ideals have been condensed into a set of principles, and adopted. These are reported in the bulletin, *Classification and Compensation Plans*, and will be briefly abstracted. The duties and responsibilities of each position should be analyzed; the positions grouped on the basis of the analysis; each position assigned to some group so formed; a group specification written to facilitate the allocation of new positions. The description of duties and responsibilities of each position should be written by the incumbent, supplemented by an additional but separate report by the supervisor. There should be provision for constant revision, of the Classification Plan under administration by the Personnel Department.

The Compensation Plan should adapt itself to the foregoing, with rules and policies clearly stated as to variations of administration, such as salary adjustments of individuals, classes of positions, or series of classes. Compensation Plans should not provide for automatic increases, since this policy creates an obligation to provide such additional funds from taxation, and also, since advancement in salary should be based upon increasing value of service. The Compensation Plan should be administered by the fiscal or budget agency.

Foreman Training "is not the work of a single mind but is a compilation of the net results of the various conferences held in the Extension Department of Pennsylvania State College." These conferences were conducted in over a hundred industrial plants. The installation and operation of training groups for various grades of employees has yielded a considerable amount of information regarding the problems and responsibilities of the foremen.

The book is devoted to problems of human nature. While foremen have their relation to the cost department, their greatest responsibility is that of discovering the latent talents of men and directing and supervising these abilities so that the men will work more happily and with less friction. The problems of management reflect immediately in the cost figures. Co-operation of all men is necessary in the teamwork of a force. Discipline must extend from above downward in order that the team may function. And it cannot be forced. Freedom of choice on the part of members of the team is essential to solidarity. Advices in the handling of men—from selection to discharge are included.

Especially good is the chapter on supervision. The supervision which means discovery and correction is of less value than that which means anticipation and prevention. Supervision means following details with an amount of attention which accords with the importance of the detail. The foreman's job can be broken down into elements or units from this standpoint. He must devise checks so that information as to the status of work may come to him systematically. When the foreman's job goes wrong it is due to lack of foresight and planning with respect to work, and due to lack of leadership with respect to men. Leadership can be developed in a foreman, by himself, by noticing the effects of his own technique.

HUMAN NATURE AND MANAGEMENT

By Ordway Tead. New York: McGraw-Hill Book Company, 1929. Pp. 312.

Reviewed by Edward S. Cowdrick

Mr. Tead has set for himself the ambitious task of expounding the essentials of labor management on a basis of psychology. In his new book he has gone somewhat deeper perhaps than has any previous writer into the motives and causes which underlie the intricate relationships between employers and employees in modern industry. The book is intended to serve as a complement to, rather than as a substitute for, existing texts in labor problems and personnel management.

The early chapters are given over to a presentation of the principles of psychological science which the author believes are applicable to industrial purposes. Here he restates some of the ideas advanced in his earlier work, *Instincts in Industry*, but he brings to bear upon the subject a matured judgment and the aid furnished by the advancement in psychological and philosophical thought in the last ten years.

With a thoroughly modern viewpoint, Mr. Tead nevertheless refuses to join with any of the conflicting schools of psychological thought. On the contrary, he makes his own selections both as to the area of the field to be covered and as to the theories to be accepted. By this method he has produced a lucid and readable argument, seemingly in no need of his prefatory warning to the reader against "becoming discouraged early in the book."

Upon this foundation of psychology, and with the whole field of industrial relations open before him, Mr. Tead might readily have written a good-sized library. Instead he has held his thesis to 300 pages, partly by an admirably compressed method of composition and partly by selecting a few aspects of personnel administration upon which to lay emphasis.

In a challenging chapter headed "The Integration of Conflicts of Purpose," Mr. Tead skillfully adapts the philosophical conception of integration—as opposed to conflict on one side and to compromise on the other—to the seeming divergencies of interests between employers and employees. He concedes, however, that there are real conflicts that are "not susceptible to absolute and final decision on a scientific basis. Facts can and should illuminate discussion of such points. But they remain points of essential disparity of interest. And further integration will require further inventiveness. In a word, we do not want necessarily to wipe out conflict—because we cannot. We want, rather, to utilize it for ends that different groups see as contributory to their best purposes. We want to keep on attempting to integrate as new conflicts emerge and thus obtain a progressively intelligent and rational control of the wayward and intractable facts of growing and complex experience."

Another chapter is given to the subject of leadership, which the author defines as "that combination of qualities by the possession of which one is able to get something done by others chiefly because through his influence they become willing to do it. It is ability to secure willing action in behalf of an established purpose. Leading means that others follow. The fact of following indicates that action is secured in a desired direction. Ability to lead is ability to get people to act—mentally or physically—toward an objective."

Other sections of the book discuss the creation of morale, the technique of group action, employment and placement, with the emphasis upon psychological methods; education and training, incentives and other methods of arousing interest, and discipline. On the last-named subject Mr. Tead advances the idea of discipline imposed and enforced by the entire group concerned rather than by executive mandate.

The concluding chapter bears the heading "Industrial Democracy Psychologically Viewed." With full recognition of all the misunderstandings that have grown up around a badly over-worked phrase, Mr. Tead makes his own definition of industrial democracy and builds up an argument for a gradually evolving situation in which economic institutions "are guided and controlled in ways calculated to allow all members of the economic community an opportunity to help formulate its objectives and, also, to realize for themselves in and through their economic life a sense of personal growth, development and realization."

THE ABILITY TO SPEAK

Speech pathology with methods in speech correction. By Sara M. Stinchfield. Boston: Expression, 1928. Pp. 266.

The psychology of speech. By Sara M. Stinchfield. Boston: Expression, 1928. Pp. 331.

Reviewed by Douglas Fryer

The ability to speak, to use one's vocal apparatus efficiently, is a prominent factor in success in many occupations, but it is one as yet given little practical consideration in the selection and guidance of persons in the occupations. Neither the industrial psychologist nor the personnel worker has very much to offer by way of suggestions for the better placement of workers according to speech abilities and the guidance of those with speech handicaps. During recent years, however, there has been an awakening interest in the speech mechanism, in speech training, and in particular, in the correction of speech defects. Several books have been written upon the psychology of language. Clinics have developed methods for the better use of the voice and the correction of bad speech habits.

Two of the leading books in this field, the two listed above, are the result of work in the speech clinic at Mt. Holyoke College by Dr. Stinchfield. Both books are full of suggestions for the personnel executive interested in the speech problems of the worker. The first is the more practical. There is a survey of speech defects, as special handicaps of the individual, and the relation of such defects to social maladjustment and to mental abnormality of both neurotic and feebleminded origin. The principles of speech correction are outlined and exercises for this purpose are given.

The Blanton-Stinchfield Speech Measurements are given in both books. These measurements are divided into two parts. One part requires a subjective rating by the examiner of voice quality, pitch, time elements, enunciation, behavior characteristics, and special speech abilities and disabilities. The other involves an objective measurement of the person's articulation, reading and speech rates, and the scope and use of vocabulary.

The Psychology of Speech—discusses the development of language in relation to the physiology of the speech mechanism. The language of children appears first as emotional expression. Animal vocal expression is emotional. There are suggestions here of the kind of language expression to be expected from the low grade worker. The development of personality is described as bound up in the speech mechanism.

SAFETY AND PRODUCTION

An engineering and statistical study of the relationship of industrial safety and production. A report by the American Engineering Council. New York: Harper and Brothers, 1928. Pp. 40.

Reviewed by Arthur Howard Sutherland

In 1925, The American Engineering Council was asked by the National Bureau of Casualty and Surety Underwriters to undertake an investigation of safety and production. Labor saving machinery has replaced men, but the number of accidents is on the increase. The hazard per man is greater; although because of the increase in output and the reduction in men, the unit of output entails a smaller percentage of accident. The principal effort therefore is to secure objective data upon the latter phase of the problem, under the thesis "the safe factory is the efficient factory"—or, efficiency in the factory and safety are two aspects of good executive control. The aim is to impress management with its responsibility for controlling the details of production in such a way as to reduce hazards.

The Council found the problem a large and complex one. Increased rate of production depends upon many factors, and safety depends not only upon material surroundings but training and direction of the working force. From the many lines of industry it was difficult to secure data which could be tabulated in comparable form. The Council spent thirteen months getting ready, three months in collecting data, and eight months in writing the report. Five thousand three hundred six companies were asked to co-operate, of whom 21.6 per cent applied data.

In order that management may have before it the cost figures and the statistics regarding accident frequency and severity, a multitude of charts and tables is included in this volume. A scatter diagram is presented in which the location of dots with reference to the axes indicates the difference in amount of increase or decrease in accidents and in production from year to year. The massing of the dots close below the axis indicates that a relatively small effort on the part of management would be required to lift the company from the undesirable to the desirable side. In other words, the data show that a conscientious effort on the part of management will make sharp inroads into the number and severity of accidents.

Special mention is made of the record of the United States Steel Corporation which in thirteen years had reduced accidents 86 per cent; the Union Pacific Shops which have a safety record five times as desirable as the average of other railroads; the Clark Thread Company showing 10,000,000 man-hours without an accident; and one of the duPont plants running eleven years with but one minor accident. Nevertheless seven lines of industry report more than 50 per cent increase in number of accidents; thirteen report more than 50 per cent increase in accident severity.

The report is extremely guarded in its references to the human factor in accidents. One reads with wonder that the "cause" of the accident was "hand tools, flying particles, slipping, chips on the floor, splinters, and the like," and recalls the small boy who was "just holding the dish in his hands when it broke." Management is reminded in this report of production loss in dollars and cents, lost time and motion, upsetting of schedules, disturbance of morale, and accident compensation, but is offered no suggestions as to procedures for correcting the conditions and reducing accidents. This failure to put the spot-light on the human factor in accidents perhaps tends to encourage complacency on the part of management, diverting attention from the necessity of more intensive individual training and management of men.

BRIEFER MENTION

The work of the international labor organization. National Industrial Conference Board. New York: Author, 1928. Pp. 197.

The International Labor Organization was created by the Treaty of Versailles. Official representatives of 55 countries are divided into sections by terms of the treaty and work is through Commissions of Enquiry on special problems, under the supervision of a governing body. Questions regarding interpretation of the provisions of the treaty as to the rights, duties, privileges and responsibilities of the Organization are submitted to the Court of International Justice at The Hague. The purpose of the organization is to collect and disseminate information on all phases of industrial employment; to overcome the inertia which prevents general adoption of reforms known to be socially and economically desirable. Regulation of Hours of Work, the Six Day Week, Governmental Agencies for Supplying Labor to the Point of Most Active Need, Employment of Women and Children in Industry, Night Work, Accident Compensation, Equality of Treatment of Foreign Workers in any Nation, Occupational Hazards and Diseases, Rest Periods and Facilities for Utilization of Workers' Spare Time, Maritime and Migration Problems are some of the items in the program of the Organization.

Economics: principles and interpretations. By Roy Emerson Curtis. Chicago: A. W. Shaw Company, 1928. Pp. 897.

The author of this elementary text has attempted to describe, illustrate and explain the principles of economics in terms so simple as to be intelligible to the beginner, so practical as to be valuable to every citizen, and yet to treat of problems which will interest more mature students. The divisions and subdivisions of the subject are conventional; the treatment in spots is confessedly the author's own view and not always in accord with orthodoxy. The final chapters are devoted to an effort to evaluate the present economic system as a continuous outgrowth of historical forms, basing the evaluation upon criteria which have been developed in the text.

The author's view regarding personnel problems, in the general scheme of economic life, emphasizes selection, training, and education as desirable features in the conservation of human resources. It is the business of the manager, not of the laborer to create and maintain an organization. Management must not be heard to complain of the intractibility of factors it has undertaken to control.

Business girls: a study of their interests and problems. By Ruth S. Cavan. Chicago: Religious Education Association, 1929. Pp. 97.

This is a study of the life of the normal girl in business. Some 600 girls are included in the investigation which was carried on by means of interview, questionnaire and case history methods among girls that frequent the Y. W. C. A. in various sections of the country. The chief interests of these girls are travel, education, saving money and meeting people. Their chief problems are lack of self-confidence, not enough advance in work, lack of money, show emotion too easily, and lack of men friends. When the problems are grouped many of them center around the personality difficulties of the normal individual. Working problems come next, while religious, moral and family problems are least in importance. The most widespread want and the thing felt the lack of most is an education. A car and better clothes, including a fur coat, are a close second. In answer to the question: "What would you like to be doing when you are 35 years old?", 82 per cent of the girls say they wish to be married while 24 per cent, including a few of those who wish to be married desire to be in business. A widespread cause of emotional difficulties is the office situation with its quarrels, intimacies, petting etc. Business life seems to rank high as a problem center and low as a center of genuine interest for these girls. The monograph is a collection of interesting facts which will help anyone in understanding the unmarried business girl of fifteen to thirty.

Report on prevention of industrial accidents. International Labour Office, Geneva. Boston: World Peace Foundation, 1929. Pp. 219.

The first part of this report gives the official attitude of 26 governments on the subject of public responsibility for industrial accidents, and on the extension of safety research. Subsequent portions contain the opinions of various governments on marking the weight of heavy packages transported by vessels and a discussion of the practical considerations involved. A recommendation for the extension to the maker, as well as to the user, of the responsibility for the lawful construction and equipment of power machinery sold in intrastate commerce is discussed in this report.

Popular psychology. By A. A. Roback. Cambridge, Mass.: Sci-Art Publishers, 1928. Pp. 260.

The author favors the Socratic method. He asks the questions which he believes the layman would ask, and gives the answers of a psychologist. The content of the question is sometimes psychological, sometimes medical, sometimes sartorial, sometimes philosophical: the layman may not be supposed to limit himself to questions which can be answered from a psychology test. Indeed this book would limit its intended usefulness if it followed the strict orthodoxy. Part I is devoted to a brief explanation of psychological terms; Part II deals with some of the phases of psychology which have become popular, and includes sample experiments from the laboratory, a list of the well-known psychologists, psychological organizations, and contributions of several nations to the subject matter. Part III answers a number of questions regarding character analysis and mental measurement.

New Books

PERSONNEL

LLOYD-JONES, ESTHER MCD. *Student personnel work at Northwestern University.* New York: Harper & Bros., 1929. 273 p. $3.50.

LABOR RELATIONS

INTERNATIONAL LABOUR CONFERENCE. *Forced labor; report and draft questionnaire.* Boston: World Peace Foundation, 1929. 320 p. $2.50.

LEESE, CHARLES LEONARD. *Collective bargaining among photo-engravers in Philadelphia.* Philadelphia: University of Pennsylvania Press, 1929. 234 p. $2.50.

VOCATIONAL INFORMATION

AMERICAN TECHNICAL SOCIETY. *Practical business administration.* Chicago: American Technical Society, 1929. 12 v. $39.80.

BRADWAY, JOHN S. *Law and social work; an introduction to the study of the legal-social field for social workers.* Chicago: University of Chicago Press, 1929. 209 p. $1.50.

CUSHING, HARVEY WILLIAMS. *The medical career; an address on the ideals, opportunities, and difficulties of the medical profession.* Hanover, New Hampshire: Dartmouth College, 1929. 53 p. Apply.

GILES, N. B., AND ELLIS, DOROTHY G. *Science of the home.* New York: Wiley, 1929. 161 p. $1.50.

HOLBROOK, HAROLD LYMAN, AND MCGREGOR, A. LEURA. *Our world of work.* Boston: Allyn & Bacon, 1929. 375 p. $1.40.

JOHNSON, MARY HOOKER. *The dean in the high school; a record of experience and experiment in secondary schools.* New York: Professional & Technical Press, 420 Lexington Avenue, 1929. 374 p. $3.25.

MCGREGOR, ANNE LAURA. *The junior high school teacher.* Garden City, N. Y.: Doubleday, Doran, 1929. 299 p. $2.00.

PURIN, C. N. *The training of teachers of the modern foreign languages.* New York: Macmillan, 1929. 126 p. Paper 75¢.

PROCTOR, WILLIAM MARTIN. *Vocations; the world's work and its workers.* Boston: Houghton, 1929. 392 p. $1.48.

YOAKUM, CLARENCE S. *Business and the young accountant; vocational experiences of the college graduate.* Ann Arbor, Mich: University of Michigan, School of Business Administration, 1929. 46 p. 50¢.

YOUNG, JOHN L. *Books from the ms. to the bookseller.* New York: Pitman, 1929. 131 p. $1.00.

EDUCATION

BURTON, WILLIAM HENRY. *The nature and direction of learning.* New York: D. Appleton, 1929. 613 p. $2.25.

CHICAGO PRINCIPALS' CLUB. *Educational measurement;* ed. by Edward E. Keener. Chicago: Author, 315 Plymouth Ct., 1929. 170 p. Paper $1.00.

Dewey, John, and others. *Art and education.* Merion, Pa.: Barnes Foundation, 1929. 359 p. $2.00.

Hopkins, Levi Thomas. *Curriculum principles and practices.* Chicago: B. H. Sanborn, 1929. 620 p. $2.75.

Keesecker, Ward W. *Laws relating to compulsory education.* Washington, D. C.: Government Printing Office; Bur. of Education, 1929. 74 p. 15¢.

Kelley, Truman Lee. *Scientific method; its function in research and in education.* Columbus, O.: Ohio State University Press, 1929. 202 p. $2.50.

Knight, Edgar Wallace. *Education in the United States.* Boston: Ginn, 1929. 590 p. $2.60.

Muse, Maude Blanche. *An introduction to efficient study habits.* Philadelphia: Saunders, 1929. 110 p. $1.00.

Owen, Ralph Albert Dornfeld. *Principles of adolescent education.* New York: Ronald Press, 1929. 442 p. $2.80.

Palmer, Anthony Ray. *Progressive practices in directing learning.* New York: Macmillan, 1929. 317 p. $2.00.

Reeves, Margaret. *Training schools for delinquent girls.* New York: Russell Sage Foundation, 1929. 455 p. $3.50.

Ruch, Giles Murrel. *The objective or new-type examination; an introduction to educational measurement.* Chicago: Scott, Foseman, 1929. 488 p. $2.20.

Struck, F. Theodore. *Methods and teaching problems in industrial education.* New York: Wiley, 1929. 214 p. $2.75.

U. S. Bureau of Education. *Education in the United States of America.* Washington, D. C.: Government Printing Office; Bureau of Education, 1929. 12 p. Apply.

Whitehouse, John Howard. *Creative education at an English school.* New York: Macmillan, 1928. 178 p. $1.50.

Wilkes, Frederick A., and others. *Elementary training for business;* rev. ed. New York: Ronald Press, 1929. 362 p. $1.60.

Wright, J. C., and Allen, C. R. *Efficiency in vocational education.* New York: Wiley, 1929. 443 p. $3.00.

ECONOMICS

Moore, Henry Ludwell. *Synthetic economics.* New York: Macmillan, 1929. 193 p. $3.00.

Mumford, H. W. and others. *Developmental study of a rural-urban trade area.* Urbana, Ill.: University of Illinois, 1929. 77 p. Apply.

SOCIOLOGY

Boothe, Viva B., ed. *Women in the modern world; the changing educational, political, economic and social relationships of women in the United States.* Philadelphia: American Academy of Political and Social Science, 1929. 404 p. Paper $2.00.

Chase, Stuart. *Men and machines.* New York: Macmillan, 1929. 354 p. $2.50.

Gee, Wilson, Ed. *Research in the social sciences;* its fundamental methods and objectives. New York: Macmillan, 1929. 315 p. $2.00.

Hertzler, J. O. *Social institutions.* New York: McGraw-Hill, 1929. 234 p. $2.50.

McDougall, William. *Modern materialism and emergent evolution.* New York: Van Nostrand, 1929. 259 p. $2.75.

Ogburn, William F., ed. *Social changes in 1928.* Chicago: University of Chicago Press, 1929. 230 p. $1.00.

Taylor, Paul S. *Mexican labor in the United States valley of the South Platte, Colorado.* Berkeley, Cal.: University of California Press, 1929. 140 p. $1.80.

INDUSTRY

Javits, Benjamin A., and Wood, Charles, W. *Make everybody rich; industry's new goal.* New York: B. C. Forbes Publishing Co., 1929. 300 p. $3.50.

Phelps, George Harrison. *Our biggest customer.* Introduction by James J. Davis, Secretary of Labor. New York: Liveright, 1929. 192 p. $2.00.

U. S. Women's Bureau. *Standards for the employment of women in industry; fourth edition.* Washington, D. C.: Government Printing Office; Superintendent of Documents. 8 p. 5¢.

MENTAL HEALTH

Fraser-Harris, David Fraser, M.D. *The A B C of nerves.* New York: Alfred Knopf, 1929. 234 p. $2.50.

Schweb, Sidney I., M. D., and Veeder, Borden Smith, M.D. *The adolescent, his conflicts and escapes.* New York: D. Appleton & Co., 1929. 365 p. $3.00.

Warthin, Alfred Scott. *Old age: the major involution; the physiology and pathology of the aging process.* New York: P. B. Hoeber, 1929. 214 p. $3.00.

PSYCHOLOGY

Bode, Boyd Henry. *Conflicting psychologies of learning.* Boston: Heath, 1929. 309 p. $2.00

Kantor, Jacob Robert. *An outline of social psychology.* Chicago: Follett Publishing Co., 1929. 434 p. $2.40.

Pintner, Rudolf. *Educational psychology.* New York: Holt, 1929. 392 p. $2.50.

Stapleton, W. Olaf. *A modern theory of ethics; a study of the relations of ethics and psychology.* New York: Dutton, 1929. 286 p. $2.75.

Tead, Ordway. *Human nature and management; the applications of psychology to executive leadership.* New York: McGraw Hill, 1929. 322 p. $3.50.

Titchener, Edward Bradford. *Systematic psychology: prolegomena.* New York: Macmillan, 1929. 289 p. $2.50.

Weiss, Albert Paul. *A theoretical basis of human behavior;* 2nd ed. rev. Columbus, O.: R. G. Adam & Co., 1929. 496 p. $3.00.

Wheeler, Raymond Holder. *The science of psychology; an introductory study.* New York: Crowell, 1929. 573 p. $3.75.

Williams, Katherine Adams. *The reward value of a conditioned stimulus.* Berkeley, Cal.: University of California Press, 1929. 24 p. Paper, 30¢.

TESTS

Franzen, Raymond. *Health Education tests; a description of the tests used in the School Health Study, with norms for fifth, and sixth grade children, and directions for giving the tests.* New York: American Child Health Association, 1929. 90 p. 90¢; paper 60¢.

Current Periodicals

Prepared by Linda H. Morley, *Industrial Relations Counselors, Inc.*

CHILD LABOR

Fletcher, Ralph, and Fletcher, Mildred. Statistical analysis of juvenile employment in St. Louis. *Journal of the American Statistical Association,* June, 1929, Vol. 25, 174–177.

Based on the methods used in M. B. Hexter's *Juvenile employment and labor mobility in the business cycle.*

COLLEGE MEN IN BUSINESS

Bowen, W. C. (Personnel Director, International Telegraph and Telephone Co.) Harvesting the college crop. *Nation's Business,* June, 1929, Vol. 17, 100, 102, 103.

Methods of selecting college graduates for work in the International Telegraph and Telephone Co.

DENNISON MANUFACTURING COMPANY

Heyes, Erying Paul. History of the Dennison Manufacturing Company. *Journal of Ecomonic and Business History."* August, 1929, Vol. 1, 467–502.

Company history, written by one who had every opportunity to get at first hand information.

ECONOMIC CONDITIONS

Industrial review of the year, July, 1928 to July 1, 1929. *Information Service,* July 27, 1929, Vol. 8, p. 1–7.

Sections on wages and living costs, working conditions; unemployment; industrial relations; strikes and lock-outs; labor movement; labor legislation; labor cases in the courts; labor benefits and insurance; labor banking; workers, education.

National Bureau of Economic Research. Report on Recent Economic Changes. *Survey*, June 1, 1929, Vol. 62, entire issue.

Reviews of the report by six writers.

ECONOMICS

Kuznets, Simon (National Bureau of Economic Research). Retardation of industrial growth. *Journal of Economic and Business History*, Vol. 1, 534–560.

Part of a study made for the Social Science Research Council. Dr. Kuznets is of the opinion that retardation of industrial growth is a fact.

EMPLOYMENT

Berridge, W. A. Employment and buying power. *American Journal of Sociology*, May, 1929, Vol. 34, 1030–1044.

Contribution to a survey of social changes in the United States in 1928.

Fatigue

Page, Richard M. On supplanting the industrial fatigue concept. *Journal of Business*, April, 1929, Vl. 2, 137–150. (Abstract in *Management Review*, July, 1929, Vol. 18, 235).

Emphasizes the value of changing the point of view from that of observing the loss due to fatigue to that of measuring the cost of energy.

Hours of Labor

Fuhs, Dr. R. (Chief of Section, International Labour Office.) International regulation of hours of work of salaried employees. *International Labour Review*, June, 1929, Vol. 19, 769–796.

Comprehensive survey, setting out the prospects and possibilities of international regulation. Complementing a report made by the International Labour Office.

HOURS OF LABOR—FIVE DAY WEEK

Progress of the 5-day week. *Monthly Labor Review*, June, 1919, Vol. 28, 1181–1190. Includes tables showing union trades in which the 5-day week or 40-hour-or-less week prevails.

HYGIENE, INDUSTRIAL

Turner, B. Factory worker and industrial hygiene. *Journal of the Royal Sanitary Institute*, November, 1928, Vol. 49, 286–290. (Abstract in *Journal of Industrial Hygiene*, June, 1929, Vol. 11, 136.)

Progress in textile factories reviewed for the last fifty years.

INCENTIVES

Whisler, R. F. (Rate and Time Study Department, National Cash Register Co.) "Uses and limitations of group incentives." *Factory and Industrial Management*, July, 1929, Vol. 78, p. 43–46.

INDUSTRIAL RELATIONS

Doak, W. N. (Editor and Manager *Railroad Trainman;* National Legislative Representative, Brotherhood of Railroad Trainmen.) Consolidation from the railroad employees' viewpoint. *Proceedings of the Academy of Political Science*, June, 1929, Vol. 13, 406–415.

Viteles, Morris S. (Department of Psychology, University of Pennsylvania.) Individual adjustment in industry. *News Bulletin, Philadelphia Personnel Association*, May, 1929, No. 46, p. 2–3. (Abstract in *Management Review*, July, 1929, Vol. 18, 235–236.)

There are two sets of factors involved: I. Factors inherent in the work; II. Factors of the mind inherent in the workers.

JOB ANALYSIS

Doll, Edgar A. (Director of Research, Training School at Vineland, N. J.) Job analysis as a basis for teaching. *Bulletin of the Taylor Society*, June, 1929, Vol. 14, 134–141.

A study showing how job analysis may contribute to the techniques of education.

OCCUPATIONS

Retail Credit Company. Chronium plating. *Industry Report*, July, 1929, Vol. 4, 1–6.

One of a series of occupational analyses being issued by this company. Gives valuable information on health, safety and occupational data.

PROFIT SHARING

Profit-sharing and labour co-partnership in 1928. *Ministry of Labour Gazette*, July, 1929, Vol. 27, 234–238.

Statistics covering Great Britain. A continuation of the figures contained in the report on profit-sharing and labor co-partnership published in 1920 and in annual articles subsequently published in the Gazette.

RESEARCH

Coes, Harold Vinton (Consulting Management Engineer, Ford, Bacon & Davis, Inc.) Reverberations of industrial and business research. *Management Review*, July, 1929, Vol. 18, 219–225.

The author comes to the conclusion that industrial and business research on the scale that it is now being applied has been a factor in the stabilization that has been obtained since 1923.

Miles, G. H. Methods of research in industrial relations. *Journal of the National Institute of Industrial Psychology*, July, 1929, Vol. 4, 373–378.

Emphasizes the difficulty of evaluating the relative importance of material and mental factors in industrial relations. Dr. Miles instances the formation of group attitudes as a mental factor too often neglected, and outlines research methods capable of taking such elements into account.

SAFETY

Bingham, W. V. Personality and the accident habit. *Aera*, December, 1928, Vol. 19, 721–723. (Abstract in Social Science Abstracts, July, 1929, Vol. 1, 651.)

Study made of the Boston Elevated Railway Co.

Smith, Clinton D. (Superintendent of Personnel, Cleveland Railway Co.) Discovering traits that make unsafe trainmen. *National Safety News*, July, 1929, Vol. 20, 31–32.

Studying accident prone employees reveals many personal causes of accidents.

SELECTION OF EMPLOYEES

Bergen, Harold B. (Manager Personnel Department, Henry L. Doherty & Co.) How personality influences selection and placement. *Bulletin of the Taylor* Society, June, 1929, Vol. 14, 130–133.

Brief discussion pointing to the need for more objective methods of personality measurement and better methods of personality training.

STANDARDS OF LIVING

Bernard, L. I. Standards of living and planes of living. *Social Forces*, December, 1928, Vol. 7, 90–202. (Abstract in *Social Science Abstracts*, July, 1929, Vol. 1, 705–706.

Suggests the terminology "Standards of living" for scientific criteria and "Planes of living" for practices.

SUGGESTION SYSTEMS

Employee suggestion systems stimulate ideas. *Aera*, June, 1929, Vol. 20, 324–328.

TESTS

Bureau of Public Personnel Administration. Measuring abstract intelligence in personnel work. *Public Personnel Studies*, May-June, 1929, Vol. 7, 69–92. Technical article dealing with methods. Many of the tests in use are explained.

Hollingsworth, F. N. Testing the man. *Electric Traction*, June, 1929, Vol. 25, 271–275.

Boston Elevated's new psychological laboratory reveals interesting facts about the reactions of car operators.

TRAINING FOREMEN

Cadbury, George (Managing Director, Cadbury Brothers, Ltd.) Need for training foremen. *Industrial Welfare*, July, 1929, Vol. 11, 221–224.

English experience.

TRAINING SALESMEN

Barnhart, E. W. (Chief, Commercial Education Service, Federal Board for Vocational Education.) Constructive conference in training salesmen and salesmanagers. *Personnel*, August, 1929, Vol. 6, 35–53.

Methods advocated by the Federal Board for Vocational Education. Includes a bibliography.

CROWELL, BRUCE. Retail salesmanship course speeds Knox hat sales. *Sales Management*, May 25, 1929, Vol. 18, 387–431. (Abstract in *Management Review*, July, 1929, Vol. 18, 245–246.

Home study course offered by the Knox Hat Company.

OSBORNE, DAVID R. (Training Director, Studebaker Corporation of America.) Training salesmen in the Studebaker Corporation of America. *Personnel*, August, 1929, Vol. 6, 53–64.

Illustrated by a number of stories from the experience of the writer.

TRUSTS

MCKINSEY, JAMES O. (Professor of Accounting, School of Commerce and Finance, University of Chicago.) Effect of mergers on marketing, production and administrative problems. *Journal of Business of the University of Chicago*, July, 1929, Vol. 2, 326–337.

Section on the position of executives and other personnel in merged companies is of special interest.

VOCATIONAL GUIDANCE

NATIONAL INSTITUTE OF INDUSTRIAL PSYCHOLOGY. Vocational selection in two firms. *Journal of the National Institute of Industrial Psychology*, July, 1929, Vol. 4, 367–372.

Rowntree's and Lewis' Ltd.

WAGES

DOUGLAS, P. J. Wages. *American Journal of Sociology*, May, 1929, Vol. 34, 1021–1029.

Contribution to a survey of social changes in the United States in 1928.

WAGES—PAYMENT METHODS

FRAIN, H. LA RUE (Industrial Research Department, University of Pennsylvania.) Methods of wage payment and market comparisons of wages. *Bulletin of the Taylor Society*, June, 1929, Vol. 14, 127-129.

Importance of recognizing differences in methods of wage payment when group experience is used as a basis of wage comparison.

WOMEN

SAUNDERS, ELEANORA B. Emotional handicaps of the professional woman. *Mental Hygiene*, January, 1929, Vol. 13, 45–61. (Abstract in Social Science Abstracts, July, 1929, Vol. 1, 703.)

Technical exposition of the difficulties now facing women in more responsible positions.

WOODHOUSE, CHASE GOING (Director, Institute of Women's Professional Relations, North Carolina College for Women, Greensboro, N. C.) Married college women in business and the professions. Annals of the American Academy of Political and Social Science, May, 1929, Vol. 143, 325–338.

Personnel Studies of Section Managers in a Department Store

By C. J. Ho, *R. H. Macy and Company*[1]

The Floor Walker has disappeared. In his stead is the Section Manager, with a multitude of duties. Dr. Ho describes the types most likely to succeed at this occupation, basing his conclusions on a study of more than a hundred section managers in one great department store.

One hundred and seven section managers of R. H. Macy & Co., were studied to determine the personnel characteristics of the successful and the unsuccessful. They were divided into three groups "good," "fair," and "poor," according to the ratings of their job performance. The groups were then compared as to age, sex, education, intelligence, marital status and personality traits. The influence of such factors on stability was also studied.

Twenty-nine per cent more of those between 35 and 45 years of age were found among the "good" group than in the "poor" group. Eighty-two per cent of the "poor" group had college education, but only 60 per cent of the "good" group had. There were thirty per cent more of those with superior intelligence in the "poor" group than in the "good" group. Fifty-eight per cent of the "good" group were married while only thirty-five per cent of the "poor" had such marital status. Men and women were in equal proportion in the "good" group, but there was a larger proportion of men than women in the "poor" group.

Men from forty to forty-nine years of age and women from thirty to thirty-nine had longest service, about one year and nine months. Those of elementary school education and average intelligence stayed longer than those of higher education and intelligence. The average length of service was eight months for men and ten months for women..

A larger proportion of the "good" section managers than the "poor" ones are free from personality difficulties; such qualities as liveliness, aggressiveness, alertness and responsiveness are found more frequently in the "good" group than in the "poor" one.

ONE of the important jobs in a department store is that of section manager. He (or she) is the person responsible for the discipline of the salesclerks of one or more sections of a selling floor and the adjustments with customers in complaints, exchanges and refunds. He was formerly known to the public as "floor walker." The duties of a section manager are numerous and most of them are detailed. One large store has a 70 page (6 inches by 3½ inches) manual for section managers, describing the various duties such as requisition for and assigning of clerks, keeping time lists, authorizing special transactions, and adjusting complaints.

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[1] Since the receipt of this manuscript Dr. Ho has returned to China.

The question often has been asked as to what types of persons make the best section managers. Do men do better than women? Is age a factor in job performance? What education and intelligence are required to succeed? What are the personality characteristics of a good section manager?

Such questions as these can be answered only by studying a large number of successful and unsuccessful cases. The various personnel factors should be studied in relation to job performance in order to determine the type of persons who are good and those who are poor on the job.

CASE HISTORIES OF SECTION MANAGERS

One hundred and seven available case histories of section managers of R. H. Macy & Co. were taken for study. The information in these cases was obtained at the time of employment in some cases and at the time of a general survey in others. None of these cases was studied for any special problem and therefore they constitute an unselected group.

TABLE 1

Age and job performance

AGE	GOOD				FAIR				POOR				TOTAL			
			Total				Total				Total				Total	
	Male	Female	Number	Per cent	Male	Female	Number	Per cent	Male	Female	Number	Per cent	Male	Female	Number	Per cent
20–24	12	12	24	41	5	9	14	44	7	4	11	65	24	25	49	46
25–29	6	10	16	28	8	2	10	32	2	1	3	17	16	13	29	27
30–34	2		2	4	2	2	4	12	1		1	6	5	2	7	6
35–39	6	4	10	17	1		1	3		1	1	6	7	5	12	11
40–44	1	4	5	8		1	1	3					1	5	6	6
45–49						1	1	3						1	1	1
50–54	1		1	2					1		1	6	2		2	2
55–59					1		1	3					1		1	1
Total	28	30	58	100	17	15	32	100	11	6	17	100	56	51	107	100
Average age	27	26	27		27	24	26		24	25	24		26	25	26	

The cases were divided into three groups: "good," "fair" and "poor," according to the ratings made by the floor superintendents to whom the section managers are responsible. Since objective measurement of job performance is impossible, ratings had to be used. The three groups were then compared as to such factors as age, education, intelligence, marital status and personality characteristics.

Age. Is there any difference in

age between the good and poor section managers? The distribution of the three groups according to age is shown in table 1.[2] It will be seen that although most of the section managers in each group are between twenty and thirty years of age, the average age of the "poor" ones is about three years younger than the average age of the "good" ones. The former is twenty-four and the latter twenty-seven. The difference is not very great, but it is significant, especially when we note that twenty-five per cent of the "good" group are between thirty-five and forty-five years of age, while only six per cent of the "poor" ones are of the same age. Younger persons may be more alert and energetic but they are likely to be less effective in this particular job than the more mature. It should be further noted that among the "good" section managers there are more women of twenty-five to thirty-five years of age and more men between thirty and forty. This evidence suggests that young women are as capable of giving satisfaction as more mature men.

Education. How much education is required to be successful in a section manager's job? It was found that college trained people were predominant in all three groups. This is due to the fact that college education has been stressed in selection. It was noted, however, that there is a larger proportion of college trained people in the "poor" group than in the "good" one, the former having eighty-two per cent and latter sixty per cent. This should not necessarily be taken to mean that the educational standard should be lowered in employment, but it does mean that college education does not differentiate the "good" from the "poor" section managers except when supplemented by other qualities. We might possibly infer that less education need be demanded of women than of men because we find that among the "good" section managers the average education of women amounts to four years of high school while that of men is two years of college.

Intelligence. How much intelligence is necessary in order to be a successful section manager? Since one of the requirements for employment is high intelligence, most of the section managers in all three groups have superior intelligence. A greater number of persons of average intelligence, however, are found among the "good" section managers than among the "poor" ones. Furthermore, the average intelligence of the "good" group is slightly lower than that of the "poor." Thirty-nine per cent of the "good" section managers have average intelligence, while only twenty per cent of the "poor" ones are of the same rating. On the other hand, fifty per cent of the "good" ones have superior intelligence while eighty per cent of the "poor" belong to the same class. The average for the "good" group, (in terms of I.Q.) is 112, while that for the "poor" is 116. This seems to indicate that superior intelligence is not necessarily a major attribute for success on the job. It is generally recognized that superior intelligence is not necessarily an advantage in social situations, but on the contrary it is sometimes a handicap, and such would seem to be the case here. The difference between the two sexes here is about the same as in the case of education. The women among the "good" group have on the average lower intelligence than the men, the former having an average I.Q. of 107 and the latter an average of 114. The same explanation as in the discussion of education is applicable here; that is, the comparatively low intelligence of women is apparently compensated for by other factors such as good personality, attractive appearance, and interest in work.

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[2] Table 1 is given as an example of the tabulations used in this study. Tables showing the relation between job performance and other factors such as education, intelligence, marital status, etc. have been omitted to save space. The significant findings in those tables are stated in the text.

Marital status. Do married persons make better section managers? The answer is in the affirmative for men and the negative for women. There are more married among the "good" section managers than among the "poor" ones, the former group having fifty-eight per cent and the latter only thirty-five per cent. Since there are fourteen per cent more men than women in the married group it is evident that single women have an equal chance to succeed with married men. Since the cases studied were largely those working full-time, the findings do not apply to part time jobs, and there is no evidence to show that married women working part-time are not successful. The numbers of widowed, divorced and separated are too small to be regarded as separate groups and therefore have been considered with the married group.

Sex. Other things being equal, does sex difference alone affect job success? That is, if a man and a woman of the same age, education, intelligence, and marital status, everything else being equal, are placed on the same job, is one more likely to succeed just because of sex difference. The answer, in general, is "No," because there is an equal number of men and women in both the "good" and "fair" groups. More men than women, however are found in the "poor" group. (It should be remembered that there are as many women as men in the section manager group.) Because of the greater number of women than men who apply for section manager positions, perhaps the women are more carefully selected and consequently there are fewer failures in this group. The difference here shown, however, is perhaps too small to be conclusive. Also, it should be borne in mind that in departments where only men or women are employed, there is no way of predicting success or failure if a manager of the other sex had been employed.

PERSONALITY TYPES AND TRAITS

What personality types and what personality traits contribute most to the successful performance of the section manager job? It must be pointed out here that personality is a whole and the effectiveness of it depends upon the integration of the various qualities. It is difficult to determine conclusively the importance of any one quality in work success, but for the sake of convenience in this study analysis had to be made and each factor had to be treated as an entity. In the analysis of the success of section managers in relation to personality, all the various factors observed by the psychiatrist were studied. It was found that only a few of them showed a consistent difference between the three groups. In order to make this report concise only those are here presented.

Personality difficulties. It is well known that a person with mental disorders, improper attitudes and abnormal behavior cannot be successful at his work except when these are compensated for by other positive qualities. Our findings bear this out. Eighty-one per cent of the "good" section managers have no personality difficulties; and seventy-seven per cent of the "fair" and only seventy per cent of the "poor" ones are free from them. The fact that there are some persons with personality difficulties who are good on the job may be explained on the hypothesis that the difficulties are not of a serious nature, or else they are compensated for by other factors, such as knowledge of the department, good appearance, etc. On the other hand, those who are free from personality difficulties and yet "poor" on the job probably possess other factors, such as immaturity or superior intelligence which for this job must be classified as undesirable or they lack interest in the work. Although we cannot conclude that one who has personality difficulties is bound to fail and that one who is free from them will succeed, it is safe to say that the former is less likely to succeed than is the latter.

Personality types. The theory has been advanced that for jobs which require personal contacts, an extrovert is better suited than an introvert. Since the Section Manager must deal with the public we should expect to find a greater number of extroverts among the good section managers. This is confirmed by our findings. Forty-three per cent of the "good" Section Managers are extroverts, thirty-nine per cent of the "fair" and only thirty per cent of the "poor" ones. On the other hand, the proportion of introverts is greater among the "poor" than among the "good" workers.

Personality traits. In considering the personality traits we find in every case studied that the "good" group contains a greater number of persons with high ratings than does the "poor" group. There are more lively persons among the "good" group than among the "poor" group, more aggressive persons, more who are responsive, alert and pleasant. Finally, those who have a good attitude towards customers succeeded more frequently than those who have just a fair one. While the differences between the three groups with respect to traits are not very great and do not prove that any one trait is more responsible for success or failure than the others, there is enough consistency to indicate a definite correlation between these traits and success on the job. They are probably more significant when they are combined in a total personality.

Experience. Does previous experience help in a section manager job? To answer this question the work histories of the section managers under study were examined. It was difficult to classify their vocational experience because of the wide range—varying from no experience to many years of retailing experience and ranging from banking to garage management, nursing to theatrical work, telephone operator to private secretary. For our purpose, however, they were grouped into three classes: those who had no experience at all before they came to Macy's; those who had some related experience such as retailing, management and the like; and those who had experience unrelated to the present work. We find that twenty-nine per cent of the "good" and twenty-six per cent of the "fair" section managers had some related experience, while only seven per cent of the "poor" ones had similar experience. It seems, then, that those who had had some experience in retailing and management have a better chance to succeed in a section manager job.

STABILITY AND PERSONNEL FACTORS

In the selection of employees, stability is always taken into consideration. What types of persons are most stable among the section managers? To answer this question, length of service was studied in relation to age, education, intelligence, marital status and sex. Such study throws additional light on personnel problems of section managers.

Age. Men from forty to forty-nine years and women from thirty to thirty-nine stayed longest, the former having a service of about one year and nine months, the latter about two years. We have already found that older men and younger women made the most satisfactory section managers. The findings here support this general theory, although there is a little difference in actual age, due to the fact that the ages in this part of the study are those at the end of the period of employment and therefore greater.

Education. When the section managers who left were grouped according to education, it was found that those who had had grammar school education stayed longest. Several points should be borne in mind in considering this fact. First, this group with only a grammar school education were probably old-timers who came before the new standards for education were set up and naturally had longest service. Those with high school or college education did not stay long, perhaps because of such reasons as dissatisfaction with wage or work. We have already found that college education did not necessarily contribute to a successful performance of the job and here we find that those with college education are not so stable.

Marital status. In the study of the influence of marital status on length of service it was found that single women and married men stayed longest; about a year in each case. Married men are more stable and responsible while single women are not distracted by domestic ties. This is in harmony with our previous findings that married men and single women succeed better on the job.

Intelligence. The length of service varies also according to intelligence. Those of average intelligence had the longest service. Those of superior intelligence tend to be less stable. This is not surprising when it is remembered that a great deal of the section manager's work is of routine nature. It requires more handling of details than initiative and creative ability. Persons of superior intelligence are likely to become dissatisfied with the opportunity for the use of initiative and consequently become restless.

Sex. When the length of service is considered in relation to the factor of sex alone there does not seem to be any difference between men and women. The average length of service for men is eight months while that for women is ten months, the average of the whole group being nine months. The slight tendency of women to stay a little longer may mean that they realize more clearly the difficulty of changing jobs. It would also be well to remember that women as a group have less specialized vocational training than have men and this may be the explanation of the longer average length of service in the section manager job, which requires little or no previous specialized training.

SUMMARY

The question "What type of persons make the best section managers?" may now be answered. Married men from thirty to forty years of age and single women of from twenty-five to thirty-five have the best chance for success in the section manager job. Men should have at least two years of college education and intelligence a little above the average. Women with high school education and average intelligence may succeed if they have other good qualities. Both men and women should be free from personality difficulties, and extroverts are preferable. They should be lively, aggressive, responsive, alert and pleasant. Those who have had some experience in retailing and management are more likely to succeed. Of course many other traits and qualities are desirable, such as a convincing manner, initiative, good appearance, good attitude and interest; but those qualifications mentioned above constitute the minimum essentials.

It must be remembered that these conclusions cannot be used too rigidly because the degree of difficulty in the job varies, and modifications have to be made in each individual case.

From the standpoint of stability, older married men and younger unmarried women of average intelligence and elementary or high school education are the best materials for section managers. It seems that those who do well on the job are also likely to be stable.

It must be admitted that some of the findings, particularly those as to personality, are not very conclusive due to the small number of cases and also to the technique of obtaining information; nevertheless they indicate certain trends or tendencies which should be of interest to personnel workers. Findings with reference to such objective facts as age, sex, etc. should be so reliable as to be of general value. Similar and fuller studies should be made in this and other stores.

Manuscript received January 5, 1929

Measurement of Clerical Ability

A Critical Review of Proposed Tests

By Roy N. Anderson, *Columbia University*

Mr. Anderson who is Research Assistant in Guidance and Personnel at Teachers College, here furnishes a valuable bibliography for a special type of aptitude test.

Batteries of tests in use for determining clerical ability are enumerated, briefly described, and the methods and results of evaluation given. The author offers a criticism of the tests listed on these points: Criterion, validity, number of cases, reliability, and the concept "general clerical aptitude."

IN THE JOURNAL OF PERSONNEL RESEARCH of April, 1927, Freyd presented a digest of tests that have been devised for the selection of typists and stenographers. As a parallel to this the writer has made a survey of the literature and tests devised for other clerical workers. The tests are listed alphabetically according to the authors who devised them.

Though some of the tests have not been standardized in the complete sense of the term, they are presented for the sake of the procedure and technique involved. A word of caution ought to be added: Each of these tests was constructed and used under a specific set of conditions. At best, then, one should avoid using the standards set up in conditions other than those under which they were devised.

I

Reference: E. D. Bartlett, A test to gauge business knowledge, PERSONNEL JOURNAL, 1927, Vol. 6, No. 3, pp. 199–204.

Description: The entire examination, called Business Test "Q," is made up of 75 questions divided into five types.

Type A. Consists of 10 problems in simple business arithmetic.

Type B. Consists of 20 questions on general business information with multiple choice answers to be checked.

Type C. This test is composed of 15 questions, and is an endeavor to gauge "business judgment" with multiple choice answers.

Type D. This is a vocabulary test consisting of 20 series of four words each, two of which are closely related in meaning.

Type E. The test is made up of 10 descriptive paragraphs of distinctive situations occurring in business. Multiple choice answers are called for.

Test "Q" has been revised into test "R." One hundred problems are included in the revised test: 20 of Type

A; 30 of Type B; 20 of Type C; and 30 of Type D. Problems of Type E are omitted.

Evaluation: Intercorrelations on Test "Q" are as follows: Ninety-seven clerks were used as subjects.

TYPE	CORRELATIONS
A	.80
B	.88
C	.79
D	.83
E	.37

The correlations between the score on test "R" and an efficiency rating made by department heads and supplemented by the Personnel Department was .79 for 50 cases (the number available). The author states, "A careful after-examination of the variables leads us to believe that, in those cases which tended to lower the coefficient, the fault was in the rating and not because the test gave a wrong picture."

Probable Errors are not given.

Where Obtainable: Mr. E. D. Bartlett, Atlantic Refining Company, 200 South Broad Street, Philadelphia, Pa.

II

Reference: E. J. Benje, Simple test for selecting office workers, *Industrial Management*, 1921, Vol. 61, No. 3, pp. 91–93.

Description: The test is composed of one hundred questions of the omnibus type.

Type A. Verifying arithmetical problems that are already solved. The subject judges whether the problem is right or wrong.

Type B. Arithmetical computations to be performed by the subject.

Type C. Checking test: the subject notes whether the two numbers of a pair are identical or different.

Type D. The subject classifies a short business letter by underlining characterizing words.

The score on the test is the per cent of accuracy determined from the number attempted and the number right.

Evaluation: The author states, "The test was standardized on about 200 cases using the department heads' rating as a criterion. The Pearson correlation was about plus .65. Percentile tables were originally based on about 800 cases and several years later were compared with a second sampling of 500 cases. The differences in results were negligible." No figures relative to Probable Error are given.

Where Obtainable: C. H. Stoelting Company, 424 North Homan Avenue, Chicago, Illinois.

III

Reference: H. E. Burtt, Employment psychology in the rubber industry, *Journal of Applied Psychology*, 1920, Vol. 4, No. 1, pp. 1–17.

Description: Ten tests for "attention," "memory," "association," and "alertness" were originally given but only four tests were retained.

Test 2. Underlining adjacent letters which formed words in a printed page of unspaced letters.

Test 3. An arithmetic test which required adding 17 to a series of numbers.

Test 4. An analogies test in the form given in Army Alpha.

Test 5. A reading test in which

alternate letters were to be omitted in order to make sense.

No further descriptions of the tests are given.

Evaluation: Ratings of branch managers and department heads correlated with test scores, by multiple correlation, .56. Figures relative to Probable Error are not given.

TEST	ORIGINAL CORRELATION	PARTIAL *r*
2	.40	.14
3	34	.17
4	.31	.18
5	.47	.23

Where Obtainable: Professor H. E. Burtt, Ohio State University, Columbus, Ohio.

IV

Reference: W. F. Dobbins, Clerical test scores and schooling: an insurance company's experience, JOURNAL OF PERSONNEL RESEARCH, 1926, Vol. 5, No. 3, pp. 83–96.

Description: Portions of ten tests prepared specially for this company by E. L. Thorndike and also parts of L. L. Thurstone's Clerical Examination Test were used.

Evaluation: Tables are presented showing the average scores of men and women, the age and amount of schooling of each. Those with most education made higher scores on the test. In each of the educational groups men made a higher average than women and also in the speed score, except in the grammar school group. The age range was rather small and had little effect upon the scores.

TESTS	WEIGHTS IN SCORING FOR ACCURACY	POINTS DEDUCTED IN SCORING FOR ACCURACY
1. Definitions	10	1 for error or omission
2. Marking unlike numbers and unlike names	10	1 for error or omission
3. Marking misspelled words	10	½ for error or omission
4. Marking certain letters	5	¼ for error or omission
5. Digit-letter substitution	5	½ for error or omission
6. Classification	15	1 for error or omission
7. Copying data	10	1 for error or omission ⅓ for items out of order ½ for abbreviation
8. Arranging names in alphabetical order	5	1 for each error in spelling or name out of order; ½ for placing initials before name instead of after
9. Matching proverbs	15	½ for error or omission
10. Arithmetical problems	15	⅓ for error or omission

The score is determined by speed modified by measures of accuracy according to the weights indicated above.

Where Obtainable: Mr. William F. Dobbins, Metropolitan Life Insurance Company, 1 Madison Avenue, New York City.

V

Reference: H. A. Filer and L. J. O'Rourke, Progress in Civil Service tests, JOURNAL OF PERSONNEL RESEARCH, 1923, Vol. 1, No. 2, pp. 484–520.

Description: An exact copy of the test is not presented but one of the sample question sheets is given. It is composed of the items usually found in clerical tests:

1. Spelling.
2. Penmanship, legibility, rapidity, neatness and general appearance of competitor's handwriting.

3. Arithmetic test consisting of practical problems in common and decimal fractions and their business application.

4. Miscellaneous clerical activities.

a. True-false test regarding the location of cities.

b. Checking similarities of names of individual companies.

c. Arrangement of cities in alphabetical order.

d. Underlining opposites in a vocabulary test.

e. Underlining two words that have the same relationships as two given words.

f. Checking a list of cities with census figures above and below certain specified figures.

g. Numbering items according to a code classication.

A practice sheet is given to the competitors which they are permitted to study and work at for four minutes, but they are not rated on this work.

Evaluation: The examination was given to 90 clerks covering a wide range of efficiency, who understood that the score they made on the examination was to have a direct bearing on the proficiency to be demanded of applicants for clerical examination. This was expected to bring forth the maximum effort.

Three independent efficiency ratings were secured on each clerk. The method of partial correlation was used in weighting the tests as follows:

Penmanship 10; spelling 20; arithmetic 20; clerical activities 50. The correlation between revised scores and efficiency ratings was .647. The correlation between test score and age was .067. The correlation between experience and efficiency was .224. No Probable Errors are given. Percentiles showing the relative position of each individual in the entire group have been computed.

Where Obtainable: United States Civil Service Commission, Washington, D. C.

VI

Reference: Lawrence Marcus, Study of selective tests for hollerith machine operators, *Journal of Applied Psychology*, 1920, Vol. 4, No. 2, pp. 196–201.

Description: The test is designed for operators on the Hollerith machine and embraces the following items:

Test 1. Cancellation (cancelling A's).

Test 2. Opposite (given a word, to write its opposite).

Test 3. Whole part (given an object, to write some part of that object).

Test 4. Substitution (100 geometric forms-random distribution, to write in each form a number according to a code).

Test 5. Directions (the task being to obey complicated directions).

Test 6. Number checking (to draw a line through every number containing both 5 and 4).

Test 7. Completion (fill in the words of mutilated sentences).

Test 8. Verb object (given a verb to write its object).

Test 9. Logical sequence (given a paragraph with sentences disarranged, to put them in proper order).

Evaluation: The criterion of efficiency was computed as follows: Efficiency equals speed times accuracy.

1. Daily output of 3,200 cards was considered one hundred per cent speed.

2. Total absence of errors was considered one hundred per cent accuracy.

3. For every error fifty was deducted from the actual output of cards, with a proportional drop in the speed rating.

4. The final per cent rating was obtained by dividing the "revised speed rating" by the "actual speed rating." The correlations between the test and efficiency are as follows:

TEST	NUMBER OF CASES	r	P.E.
1	125	.019	.059
2	137	.154	.956
3	137	.119	.056
4	134	.236	.055
5	133	.048	.058
6	137	.094	.057
7	138	.211	.054
8	136	.031	.058
9	138	.316	051

It was found that better results could be obtained by grouping tests into batteries. The various batteries consisted of the following different tests:

	r	P.E.
Team 3 (134 cases) Tests 4–7–9	.453	.045
Team 5 (134 cases) Tests 2–3–4–7–9	.448	045
Test 6 (138 cases) Tests 1–2–3–4–7–9	.373	05

Where Obtainable: Complete instructions concerning these tests are not available.

VII

Reference: D. G. Paterson, The Scott Company's file clerk test, Journal of Personnel Research, 1923, Vol. 1, No. 12, pp. 547–561.

Description: Test 1. Six groups of five items each. One group of numbers alternating with one group of names to be checked for sameness. Time, 2 minutes; score, right minus wrong.

Test 2. A list of thirty-nine names. The alphabet is divided into seven divisions each bearing a number, the numbers of the respective divisions are to be placed before each name. Time, 2 minutes; score, number right.

Test 3. Arrangement of names according to alphabetical order. Time, 3 minutes; score, number right times three.

Test 4. This test is composed of nine lists of six different number combinations ranging from four to six digits. They are to be rated from one to six in order of their numerical value. Time, 3 minutes; score, number right times three.

Test 5. Twenty-five sentences to be classified topically. After each sentence there are five words and the subject must indicate the word that correctly describes the sentence. Time, one and one-half minutes; score, number right.

Test 6. Six short paragraphs each followed by five pertinent questions bearing on the paragraph. Thirty questions in all. Time, three and one-half minutes; score, number right.

Evaluation: The tests were given to 112 file clerks in four companies. With a possible score of 178 the range was from five to 155 with a mean score of 68. Ratings were obtained regarding 43 subjects and the correlation between the total score in the test and the ratings was .82 (Pearson Product Moments). A Mental Alertness Test was also given. The correlation between the ratings and the standings on this test was .63; and the correlation of the scores on the file clerk test and the mental alertness test was .68. Those who made high scores on the "file clerk test" tended to make high scores on the Mental Alertness Test. From a study of the exceptions, as to the relative values of the two tests, the author believes the "file clerk test" is of greater value than the Mental Alertness Test in some cases; and that the Mental Alertness Test alone indicates one's ability to advance to more responsible work of a clerical nature, while the "file clerk test" alone gives a better indication of specific ability as a file clerk. No Probable Errors are given.

Where Obtainable: C. H. Stoelting Company, 424 North Homan Avenue, Chicago, Illinois.

VIII

Reference: A. M. Ruggles, *A diagnostic test of aptitude for clerical workers.* New York: Bureau of Publications, Teachers College, 1924.

Description: Test 1. Required to check a copy list against an original list as to correctness of name, address, and amount (85 items).

Test 2. The names of 184 cities with the figures for population and number of patrons. Required to check each item where number of patrons is more than half the population of city.

Test 3. Fifty names to be filed alphabetically in a larger file of names.

Test 4. One hundred ninety-one items to be classified according to a fourfold basis. Items that can not be thus classified are to be disregarded.

Test 5. Required to copy on another page figures of crop acreage which are classified under various counties.

Test 6. Thirty-nine problems in simple arithmetic.

Evaluation: The author made a minute classification of the clerical duties before attempting to formulate the test. He then gave it to 188 employees (classified below) in various large and nationally known business concerns.

CODE LETTER	TITLE OF CLERK	NUMBER IN GROUP
A	Billing clerks	27
B	Billing clerks-Elliot-Fisher operators	49
C	Dividend	21
D	Auditing	24
E	Order clerks	15
F	Pricing clerks	22
G	Payroll clerks	15
H	Payroll clerks	15
Total		188

Scoring and weighing were determined by appropriate statistical devices. The correlation between proficiency and the test scores with best weight for the errors for the subjects in groups A to G inclusive are as follows:

TEST	CORRELATION	VARIABILITY*
1	.41	.16
2	.44	.21
3	.39	.07
4	.33	.12
5	.39	.10
6	.46	.16

* Average deviations of the correlations from their average.

The author distinguishes between "aptitude criterion" and "efficiency criterion." While he believes the test serves as a trade test, he also believes that it is an aptitude test.

Where Obtainable: Wisconsin Civil Service Commission, Madison, Wisconsin.

IX

Reference: F. Telford and F. A. Moss, Suggested tests for senior clerk, *Public Personnel Studies*, Volume 2, Number 6, September, 1924. Pp. 195–213.

Description: Test 1. Office work and terms. Twenty multiple-choice questions. Time, ten minutes, weight, two.

Test 2. Following ten written directions as to checking of items in a table. Time, 15 minutes; weight, one and one-half.

Test 3. Comparing an original and a copy of ten items to detect errors. Time, five minutes; weight, one-half.

Test 4. Alphabetical filing of ten names in a given list of 60 names in accordance with rules given in directions. Time, ten minutes; weight, one-half.

Test 5. Assigning a descriptive name to each of ten business transactions. Time, five minutes; weight, one.

Test 6. Reading test composed of business practices or office management. Time, five minutes; weight, one.

Test 7. A business arithmetic test of ten problems. Time, ten minutes; weight, one.

Test 8. Memory for office directions frequently given to a clerk. Time, seven minutes; weight, one-half.

Test 9. Education and experience. Time, ten minutes; weight, two.

Evaluation: Set. 1. "Practically all the materials in this set of suggested tests have been tried out with somewhat fewer than 100 persons about one-half of whom are of known clerical ability."

Set 2. "The material in this suggested set of tests for senior clerks has been tried out with only a few persons but with a sufficient number to give reasonable assurance that the difficulty of the material is approximately the same as that of Set 1."

X

Reference: Partially standardized test for junior clerk, *Public Personnel Studies*, 1925, Vol. 3, No. 12, pp. 346–372.

Description: Test 1. Copying and adding.

Test 2. Business information: Section A. Twenty-one questions calling for information about business practices. (Multiple choice type). Section B. Similar to above. (Completion type).

Test 3. Alphabetical filing test.

Test 4. Understanding of printed literature dealing with office problems.

Test 5. A "social intelligence test" (multiple choice).

Test 6. Understanding and following written directions.

Test 7. Completion of tabulations as set forth in a partially complete table.

Test 8. Memory for oral directions.

Test 9. "Abstract Intelligence."

Test 10. Education and experience.

Evaluation: No information given.

XI

The following tests have also appeared from time to time in *Public Personnel Studies*. They will not be described here as they are similar to the two examples cited above. Few figures are furnished concerning the reliability or validity of these tests. Reference Number 8 (below) refers to an attempt to accomplish this in the case of the test published in Vol. 3, No. 12, December, 1925. It presents the distributions and means of the total scores, also figures showing the "reliability" of the tests. Reference Number 9 gives statistical data regarding tests for junior clerk published in Vol. 5, No. 7, September, 1927. It gives indices of correlation between the test and amount of education and clerical experience.

References: 1. Suggested tests for senior clerk, 1924, Vol. 2, No. 6, pp. 195–213.

2. Suggested tests for supervising clerk, 1924, Vol. 2, No. 9, pp. 288–297.

3. Partially standardized tests for junior clerk, 1925, Vol. 3, No. 2, pp. 346–372.

4. Suggested tests for private branch exchange operator, 1926, Vol. 4, No. 2, pp. 66–79.

5. Suggested tests for senior clerk, 1926, Vol. 4, No. 5, pp. 166–176.

6. Standardized tests for alphabetical filing and ability to understand and follow written directions, 1927, Vol. 5, No. 4, pp. 80–88.

7. Partially standardized tests for senior clerk, 1927, Vol. 5, No. 7, pp. 144–158.

8. Partially standardized tests for junior clerk, 1927, Vol. 5, No. 9, pp. 199–202.

9. Information and data regarding tests previously published, 1927, Vol. 5, No. 11, pp. 240–241. (Partially standardized tests for junior clerk, Vol. 5, No. 9). Correlation of the test with educational experience, .19 ± .064 and correlation of test with clerical experience .19 ±.064.

10. A comparative study of clerical tests, 1923, Vol. 1, No. 2, 3, 4, 5, 6. In this volume Dr. Thurstone gives a complete survey of the tests used up to this time in various civil service bureaus throughout the country. They appear under the following headings:

Part I. Arithmetic and spelling
Part II. Classifying and tabulating
Part III. Tests of business information
Part IV. Grammar, reading, letter writing, oral English
Part V. Proof reading, alphabetizing, and filing.

Where Obtainable: Bureau of Public Personnel Administration, 923 East 60 Street, Chicago.

XII

Reference: L. L. Thurstone, A standardized test for office clerks, *Journal of Applied Psychology*, 1919, Vol. 3, pp. 248–251.

Description: A. One hundred twenty solved arithmetical problems are given in which the subject checks errors which occur in about ten per cent of the problems.

B. The subject is required to underline the incorrectly spelled words found in an extract from Arnold Bennett's "Mental Efficiency."

C. The cancellation of letters x, z, u, and c.

D. This test is composed of a short code-learning exercise.

E. A list of 40 names and a list of 40 cities is given. The subject is to arrange the names alphabetically under the cities designated.

F. The subject checks insurance policies in three classes; according to the amount, kind of policy, and date of issuance. The applicant is to choose his own systematic approach to the problem.

G. The subject is required to solve 12 arithmetical problems in addition, multiplication, subtraction, fractions and percentage.

H. Matching of 11 proverbs with 11 similar proverbs which have the same meaning or moral.

The time required for the administration of the test is on the average 40 minutes. Maximum time allowed is 90 minutes.

Evaluation: The test was evaluated on 100 employees of a large insurance company ranging from minor executives to office clerks doing routine work. The employees were rated in five classes according to the grade of office work for which they were employed. The grade of work actually done by the candidates correlated with:

Accuracy in test	.50
Speed in test	.42
Schooling	.47
Age	.35

Multiple correlation coefficients were as follows:

Accuracy and speed	.61
Schooling and age	.52
Accuracy, speed and schooling	.64
Accuracy, speed, schooling and age	.67

It would appear that accuracy and speed in the clerical examination are more indicative of ability in clerical work than age and schooling.

No probable errors are given.

Where Obtainable: World Book Company, Yonkers, N. Y.

XIII

Reference: H. A. Toops, *Tests for vocational guidance of children 13-16*[1] New York: Bureau of Publication, Teachers College, 1923.

Description C-1: Test 1. Letter checking test.

Test 2. Number checking test (for one number).

Test 3. Number checking test (for two numbers).

Test 4. Comparison of two columns of numbers of 6 digits.

Test 5. Has been eliminated and an alternative is being constructed.

Test 6. A list of twenty-five names is given and the subject is required to find the addresses of the individuals in a directory.

Description C-2: Test 1. One hundred twenty solved problems in addition and subtraction. Time, three minutes.

Test 2. A price-mark code with letters representing numbers zero to nine is given and subject is required to utilize this code for a given number of prices. Time, four minutes.

Test 3. The copying of 50 numbers ranging from 5 to 9 digits. Time, four minutes.

Test 4. A chart is given showing the

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[1] Instead of giving the tests to individuals who have already had occupational training and experience, Toops gave these tests to children between the ages of 13 and 16 before they left school. These children are being followed up in order to see what relationship there may be between their success on any or all of the tests and specific occupational activities.

different qualities possessed by a list of eight fruits. Illustration:

> Which fruit is juicy, round and thick peeled? . . . . (2)
> Which fruit is red and sweet? . (1)

By examining the table we see that number 2 (an orange) is the only fruit given which has at least all these qualities asked for. Number 1 (an apple) is the only red and sweet fruit. The test consists of 15 items like the above sample. Time, five minutes.

Test 5. Sentence completion test. (Multiple choice). Time, two minutes.

Test 6. Vocabulary classification test. 100 words to be classified according to given categories. Time, two and one-half minutes.

Test 7. Twenty questions with the words spelled in reverse order. Subject to read sentence and answer question. Time, five and one half minutes.

Test 8. Thirty true-false statements. Time, three minutes.

Evaluation: The criterion was devised by an elaborate weighting of data taken from grade books, school register, attendance books and various other sources including performance on tests devised for this purpose. Seven variables on stenographic ability, five variables on typing ability and six variables on bookkeeping were used and the averages and standard deviations were computed. To obtain the general business criterion, these three criterion-variables, were changed into their respective sigmas. Two judges who had worked in securing the above variables distributed independently twenty units between the variables and then a compromise weighting was obtained from these two ratings. Norms have been established in deciles based on records from 13 and 14 year old boys and girls. They have not been extended to adult levels as yet. The tests were administered to adult workers in various companies. The results were felt to be most trustworthy in one company where the tests were administered to 73 employees. An elaborate system of ratings made by supervisors was used as the criterion. Correlation coefficient between the criterion and Test-1 was .40 ±.07; and with Test C-2 (without Test 5) .38 ±.07. It is thought that Test C-1 and C-2 measure somewhat different abilities, the correlation between the two being .71.

Where Obtainable: Institute of Educational Research, Teachers College, Columbia University, New York City.

XIV

Reference: M. S. Viteles, Job specifications and diagnostic tests of job competency designed for auditing division of street railway company, *Psychological Clinic*, 1922–23, Vol. 14, pp. 83–105.

Description: Numerous tests were tried out and some were discarded. The following ten tests were retained for the use of guiding applicants toward positions on the basis of specific job competency. (No detailed descriptions of the individual tests are given.)

1. Arithmetic A
2. Arithmetic B
3. Mental arithmetic
4. Number checking
5. Copy checking
6. Tabulation
7. Typist list

8. Stenographic test
9. Alphabetical filing
10. Language test

A "critical level" was established for each test.

Evaluation: Tests were grouped into various batteries consisting of four or five of the above tests. The correlation coefficients between the standings in the tests and degrees of job proficiency are as follows (Pearson Rank Difference Formula):

TESTS	r	P.E.
Battery 1	.68	.07
Battery 2	.72	.09
Battery 5	65	.12

No correlations are given for batteries 3, 4 and 6. A total score was established for each battery and the applicant's total score was used as the basis for selection.

Where Obtainable: Dr. M. S. Viteles, University of Pennsylvania, Philadelphia, Pennsylvania.

SUMMARY AND CONCLUSIONS

In attempting to evaluate *en gros* the investigations which we have just examined, we should note the extent to which they fulfill the requirements of scientific method:

1. *Criterion of vocational success.* The first of these requirements is that before a test can be considered to be a test of any trait it must be given to a group of persons who have a *known* proficiency in the trait being tested. This presupposes that the investigator have a measure of the occupational proficiency of the subjects. This measure is technically known as a criterion. Such measures are admittedly hard to get. What should one use as a measure of the proficiency of a general, or even a special kind of clerical worker? The only objective measures available are amount of work or number of errors. These are hard to obtain, partly because employers rarely keep such records on clerical workers; partly because the tasks performed are miscellaneous and unstandardized. Faced with these difficulties, most of the investigators reported here, used ratings made by supervisors and department heads. This method is so unsatisfactory as to need no comment here. The remark of one investigator reveals the lack of confidence with which he, himself, viewed these ratings: "In those cases which tended to lower the coefficient, the fault was in the rating and not because the test gave a wrong picture." And still such ratings are the criterion with which one is trying to determine whether the test is good.

If one is driven to use the questionable criterion of ratings one might surely be expected to evaluate these ratings and determine how reliable they are; but of the ten investigators who used ratings, only two reported any statistical treatment of their ratings.

2. *Validity.* The next requirement that must be observed in devising a test for detecting aptitude is that, given a good criterion, one must prove that the persons who stand high in the test stand high in the trait (occupational proficiency) one is trying to test; and that those who stand low in the test stand low in the trait one is attempting to measure. The means

usually employed in showing such relationship is the coefficient of correlation. And this method was used by all but two of the investigators.

But this method is greatly abused in the field of vocational testing. In the first place there are a number of formulae by which to compute correlation. One formula may be adapted to one set of figures and be inapplicable to another set. For the most part, investigators in the field of vocational testing seize upon one formula, the easiest to apply, and use it. For example, they use r without taking the trouble to ascertain if they have a straight line of regression.

Again, there is misunderstanding as to what size the correlation coefficient must be in order to be "high." Some investigators point to a correlation coefficient of .50 as "high" whereas it may be really only "significant." A correlation of .50 is often taken to indicate a forecasting efficiency of 50 per cent, but according to the computations made by Hull[2] a correlation coefficient of .50 has only a forcasting efficiency of 13 per cent, and one of .70 only 30 per cent. Therefore it would appear that so far as practical purposes are concerned the tests reviewed above are exceedingly inefficient.

Still more serious is the neglect to furnish information showing the significance of the index of correlation. The value of an index of correlation can be shown in terms of the Probable Error, yet in these ten researches in which the method of correlation was employed one-half did not mention the Probable Error.

3. *Number of cases.* The size of the Probable Error is determined in part by the number of cases employed. The researches under discussion averaged around 100 cases although some had as few as 50 cases. Considering the known difficulty of obtaining subjects for experimentation in the field of occupations, this may be a sufficiently large number, still it should be related to the size of the correlation in terms of the Probable Error.

4. *Reliability.* Since a test is at best only a sample of the ability which is being measured, this sample should be as representative as possible. Accordingly, before a test can be taken seriously it must be shown to have a high degree of reliability. The degree of reliability may be determined by correlating alternate parts of the test, or by repeating the same test at a later date. The correlation in this procedure should be very high, above 90, because if the test is to be of any value, the subject must make relatively the same score on the test at different times. In none of these investigations was information given regarding the reliability.

After a comprehensive study of the work done in this field we are forced to admit that none of the tests will serve as a reliable measure of "aptitude for clerical work." Some of them may possibly be valid as tests of acquired ability, that is, they may be classed as Trade Tests, which give a measure of the degree of skill that an individual has acquired in the performance of clerical tasks, but they tell us little about the possibilities of an inexperienced person.

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[2] Clark L. Hull, The correlation coefficient and its prognostic significance, *Journal of Educational Research*, Vol. 15, No. 5, May, 1927, pp. 327-338.

In reply to the claim that some of these tests seem to show valid correlation with performances we may well adopt the explanation offered by Toops: "It may, therefore, be that the correlations of about .70 found between the general Clerical Test (when properly weighted) and success in business school work in stenography, typing, and bookkeeping are due to its value as a test of ability to deal with ideas rather than to its value as a test of ability to deal with clerical items and procedures."

This view is substantiated by Poffenberger[3] who made a study of 62 students in a high grade secretarial school in New York City. The Army Alpha intelligence test was used for one year and the school authorities supplied data regarding the rating of the students. Poffenberger concludes: "Judging from the size of the coefficient of correlation, certain of the separate parts of the Alpha examination are as effective for discovering typing and stenographic ability as are special tests which have been tried out for that purpose." In other words, any value which the tests have for prognostic purposes may be due simply to the fact that they are good intelligence tests.

Finally, a critical reviewer of these reports might question whether we are justified in speaking of "general clerical ability" and trying to measure it by means of tests. When we consider that clerical tasks are of varying sorts, ranging from the manipulation of complicated machines such as calculators to simple stamping of envelopes, it might seem to devise a test which would show aptitude for doing all those varied tasks is if not impossible at least a feat of major difficulty.

Manuscript received August 22, 1929

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[3] A. T. Poffenberger, Selection of a successful secretary, *Journal of Applied Psychology*, Vol. 4, No. 2, p. 155.

Personnel Relations in Business

A Functional Conception from the Point of View of the General Manager

By Franklin J. Meine, *Chicago*

In outline form Mr. Meine gives a comprehensive conception and definition of personnel relations in business from the point of view of the general manager.

This paper presents a general, systematic conception of personnel relations equally useful in all branches of business. In part I the point of view, functional and management, is sharply defined against a background of two other leading points of view in this field: the social and the individual. The second part lists in uniform phrasing the major personnel functions and sub-functions with specific personnel activities found in carrying out those functions. This analysis provides an orderly outline and check-list, and it also serves to interpret specifically what is meant by the general concept. Part III points out the various uses to which the conception and outline can be put in business, research and teaching.

PERSONNEL relations are herein presented as a series of *functions* and *activities* which are concerned primarily with the relations of the business firm to its personnel, that is, all the individuals in its employ. These relations include employing, paying and maintaining the personnel of the firm.

THE FUNCTIONAL VIEW OF PERSONNEL RELATIONS

Since this paper presents personnel functions apart from the administrative complications in which personnel relations happen to be found, it is essential to distinguish between the administrative and the functional points of view.

The functional point of view emphasizes the thing to be done while the administrative point of view is concerned primarily with who is responsible for doing it and the mechanics of doing it. Employing, for example, may be regarded as a *function* apart from its administrative setting. It is considered as a process of selecting men for positions regardless of the agencies and technique involved in the performance of the function.

THE POINT OF VIEW

These personnel functions are regarded, further, from the point of view of the general manager, that is, the person or group of persons actively in charge of the conduct of the firm.

The management point of view is that of the individual business firm conducted for profit. The significance of this view in personnel relations becomes more apparent when briefly compared with two other prominent points of view in this field: that of the individual employee and that of society. These points of view,—management, individual, and social,—are usually not found alone, but in combination; and the purpose here is simply to point the direction of emphasis in each.

The conception of personnel relations from the point of view of the individual employee is cast in terms of what the worker wants, what is on the worker's mind, or in terms of the individual employee's capacities, interests, and opportunities. The harmonious psychological adjustment of the individual employee and of groups of employees to the business environment is of first importance. The emphasis is upon the individual.

A general social point of view raises questions of what is "right," and what is socially desirable. In regard to the open *vs.* closed shop issue, for example, such questions as these are frequently asked: Has the union any "right" to tell the employer whom he shall employ? Has the employer any "right" to discriminate against union men? Is it socially right or desirable to have unions and employers, while disputing the issue, curtail production? These questions presuppose a general social point of view.

Important as these two points of view are, the social and the individual, it is not the purpose of this paper to enquire how or why management takes them into account. This paper aims to describe objectively what management does: to present personnel functions and activities as they are actually found in the business firm.

The various personnel activities cited are being carried on by successful firms in the United States today. This conception of personnel relations deals therefore not with what should be, but with what is; and is consequently a thoroughly practical view obtained through observation of best business practice.

Personnel relations must be evaluatedas a whole; and to do so they must be viewed comprehensively. The relations of the individual worker to the firm for which he works are highly complex and intimately inter-related. To single out some one phase or group of personnel relations as distinct and separate from all the personnel activities of a firm gives a false picture of that firm's relations with its employees. A firm may boast a pension plan or a works committee, but these facts may be of little significance if that same firm has a defective wage system or fights all forms of dealing jointly with its employees.

To get a fundamentally sound conception, personnel relations must be conceived as a complexly interwoven group of activities. A rounded and complete view is all important.

PERSONNEL RESEARCH

Research is not treated as a separate and distinct personnel function. Nor are the personnel activities listed under the functions designated as primarily administrative or primarily research: they may be either or both.

Each personnel function necessarily involves questions of administration *and* of research (in the broad sense of inquiry "how to do it"); but this further differentiation is beyond the purpose of this paper, which is to consider these functions and activities in their primary aspect as personnel relations.

A CONCEPT APPLICABLE TO PERSONNEL RELATIONS IN GENERAL

Personnel relations are here conceived as essentially the same in nature whether in factory, office, retail store, public service, or bank. Frequently change in phraseology is needed, but the concept remains equally applicable to the various branches of business.

MAJOR PERSONNEL FUNCTIONS

The following is a list and first summary of the major personnel functions. Subsequently each major function will be analyzed into a number of sub-functions and subordinated to these will be listed personnel activities frequently associated with the carrying out of those functions.

I. *Employing*
II. *Training and Educating*
III. *Paying*
IV. *Supervising*
V. *Motivating (Incentives)*
VI. *Providing Effective Working Conditions*
VII. *Promoting Health*
VIII. *Improving Living Conditions*
IX. *Dealing Jointly with Employees*

In the outline following, there is some overlapping *i.e.*, the same personnel activity is listed under more than one function. This is necessarily so, because many personnel activities perform several functions. The functional point of view emphasizes this important fact.

For example: Promoting employees is listed under two functions; Employing and Motivating. The technique of promoting is largely a matter of Employing; in its aspect as an incentive, promoting appears under Motivating. Again, Organized Representation appears under *Dealing Jointly with Employees*, and also under *Motivating*. The same activity appears in two or more places, and in each place that aspect of it is emphasized which accords with the function it there performs.

I. *Employing*
  A. Specifying personnel requirements
    1. Listing and classifying jobs (occupations)
    2. Specifying job (occupational) requirements
      a. Job (occupational) specification
      b. Personnel specification
    3. Requisitioning personnel needed
      a. Total needs for period of time
      b. Immediate
  B. Getting prospective employees
    1. Sources
      a. Door applicants
      b. Prospect files
      c. General groups to which firm may have ready access (employees, schools, age, sex, nativity, trade groups, etc.)
    2. Channels
      a. Solicitation
        (1) Visits
        (2) Advertising
        (3) Correspondence
      b. Agencies
        (1) Private commercial

        - (2) Private non-commercial
            - (a) Employers
            - (b) Employer associations
            - (c) Trade unions
            - (d) Other institutions
        - (3) Public
            - (a) Municipal
            - (b) State
            - (c) Federal
- C. Receiving employees
    - 1. Layout
    - 2. Procedure
- D. Ascertaining fitness of prospective employees
    - 1. Interviewing prospective employee
        - a. References
        - b. Records of previous employment
        - c. Application forms
        - d. Casual questions
    - 2. Examining (testing)
        - a. Occupational
        - b. Physical
        - c. Psychological
    - 3. Trying out employee at work
- E. Hiring
    - 1. Informing prospective employee
    - 2. Assigning beginning wage rate
    - 3. Completing details—drawing up agreement, photograph, filing bond, signing "check-off" or wage assignment orders, etc.
- F. Placing
    - 1. Instructing employee
    - 2. Introducing employee to supervisor
    - 3. Assigning to duties
    - 4. Following-up
- G. Transferring
- H. Promoting
- I. Terminating
    - 1. Laying off
    - 2. Discharging
    - 3. Resigning, quitting

II. *Training and educating*
- A. Ascertaining needs and requirements
    - 1. Agencies
        - a. Existing
        - b. New agencies needed
    - 2. Subjects
        - a. Occupational
        - b. Business
            - (1) General
            - (2) Firm
        - c. Citizenship
        - d. Americanization
- B. Preparing teaching material
    - 1. Occupational
        - a. Analyzing jobs (occupations) for training purposes
        - b. Organizing job (occupational) content for teaching
    - 2. General
- C. Selecting methods of training
    - 1. For manual workers
        - a. Apprentice school
        - b. Part-time school
        - c. Vestibule school
        - d. Job instructors
        - e. Supervisors (foremen, chief clerks, etc.)
        - f. Experienced individuals non-supervisory
    - 2. For supervisory staff
        - a. Special courses
        - b. "Understudy" methods
        - c. Flying squadron
        - d. Student training
        - e. Group meetings
        - f. Association membership and meetings
        - g. Literature
- D. Training executives and supervisors in the use of the methods selected
- E. Following-up and evaluating the effectiveness of the training

III. *Paying*
- A. Standardizing wage rates
    - 1. Selecting minimum wage rate
        - a. Adjusting wage rates to current and local economic conditions
    - 2. Analyzing jobs (occupations) for wage rate purposes
    - 3. Setting standards of performance

- 4. Evaluating jobs for rates
- 5. Evaluating individuals for rate purposes
- B. Selecting methods of wage payment
  - 1. Time bases
    - a. Hourly
    - b. Weekly
    - c. Monthly
  - 2. Output bases (production, sales)
    - a. Piece-work
      - (1) Individual
      - (2) Group
      - (3) Pooled
    - b. Contract
      - (1) Tasks
      - (2) Allotments
      - (3) Sub-contracting
    - c. Output Bonuses, or Premium
      - (1) Individual
      - (2) Group
  - 3. Service bases
    - a. Output plus quality
    - b. Output plus length of service
    - c. Output plus personal interest
      - (1) Attendance
      - (2) Punctuality
      - (3) Suggestions
- C. Paying off
  - 1. Keeping track of individual's "service" (Time keeping, etc. See IV—C.)
  - 2. Paying off
    - a. Frequency
    - b. Day
    - c. Form
- D. Adjusting individual wages
  - 1. Errors
  - 2. Reviewing individual wages periodically

IV. *Supervising*

- A. Informing and directing individuals
  - 1. Bulletins
  - 2. House organs
  - 3. Handbooks
    - a. Employee
    - b. Supervisory
  - 4. Instruction cards
  - 5. Verbal
    - a. Group
    - b. Individual
- B. Judging individuals
  - 1. Rating (methods of judging)
- C. Recording of individual's
  - 1. Work: quantity and quality
  - 2. Time
  - 3. Pay
  - 4. Individual qualifications
- D. Disciplining
  - 1. Making rules and regulations
    - a. Source
      - (1) Firm
      - (2) Employees
    - b. Subjects
      - (1) Hours
      - (2) Attendance
      - (3) Wages
      - (4) Work
      - (5) Conduct
      - (6) Tenure of job
  - 2. Applying rules and regulations
    - a. Handling infractions

V. *Motivating* (*Incentives*)

- A. Appealing to employees
  - 1. To increase quantity of work
    - a. Records
    - b. Competition
  - 2. To improve quality of work
    - a. Records
    - b. Competition
- B. Rewarding desired performance
  - 1. Wage increases
  - 2. Promotions
  - 3. Pensions (long service)
  - 4. Recognition of individual acts
    - a. By firm
      - (1) Special notice
      - (2) Prizes
      - (3) Special privileges
    - b. By individual supervisor
- C. Encouraging employee activities
  - 1. Social
  - 2. Athletic
  - 3. Financial (See VIII—A, B, C)
  - 4. Educational
- D. Encouraging employee participation in firm activities

- 1. Suggestion systems
- 2. Participation in management through joint dealing
  - a. Individual employee in firm counsel
  - b. Informal committees
  - c. Organized representation
    - (1) Trades unions
    - (2) Shop committees
- 3. Firm ownership
  - a. Profit sharing
  - b. Stock purchase

VI. *Providing Effective Working Conditions*

- A. Providing physical conditions
  - 1. Work provisions
    - a. Building construction
    - b. Tables, chairs, etc.
    - c. Tools
  - 2. Air
    - a. Temperature
    - b. Humidity
    - c. Ventilation
    - d. Dust, gas, etc.
  - 3. Light
  - 4. Noise
- B. Protecting the individual (Safety)
  - 1. Preventing accidents
    - a. Informing and educating (See functions II, IV, & V)
      - 1. Literature: bulletin boards, house organs, pamphlets, etc.
      - 2. Incentives: "drives," competitions, awards
      - 3. Instruction: individual and group
    - b. Organizing safety groups (committees, etc.)
  - 2. Providing physical safeguards
    - a. Mechanical
    - b. General building
    - c. Fire
  - 3. Inspecting
  - 4. Alleviating injury
    - a. First aid
    - b. Medical service (See function VII)
  - 5. Compensating for injury (See also VIII—C—1

VII. *Promoting Health*

- A. Sanitation and hygiene
  - 1. Cleanliness of place
  - 2. Washing facilities
  - 3. Toilets
  - 4. Rest rooms
  - 5. Clothes-lockers, clothes-racks, -rooms
  - 6. Drinking water
- B. Providing medical care
  - 1. Medical examinations
  - 2. Clinics (including psychiatric)
  - 3. Dispensaries and hospitals
  - 4. Care for special diseases (including mental)
  - 5. Nurse service
    - a. Firm
    - b. Home
- C. Rest and Recreation
  - 1. Fatigue
    - a. Order of work
    - b. Rest periods
      - (1) During work hours
      - (2) Noon period
  - 2. Exercise
    - a. Gymnasium
    - b. Competitive athletics
  - 3. Vacations, outings, excursions
- D. Supplying food
  - 1. Dining rooms
  - 2. Stores
  - 3. Special purchases

VIII. *Improving Living Conditions*

- A. Housing
  - 1. Building
  - 2. Owning
  - 3. Financing
- B. Financing
  - 1. Loans
    - a. Remedial
      - (1) Firm
      - (2) Credit unions
    - b. Building
  - 2. Savings plans
  - 3. Profit sharing
- C. Insuring
  - 1. Sickness and accident
    - a. Firm
    - b. Benefit associations

    2. Life insurance
    3. Old age insurance (Pensions)
    4. Unemployment insurance
- IX. *Dealing Jointly with Employees*[1]
  - A. Adopting attitude (toward dealing jointly); "fighting" any form of joint action; passive attitude; mild approval and partial participation, or full participation
  - B. Organizing
    - 1. Associations
      - a. Employee: trade unions or company unions
      - b. Employers' associations
    - 2. Organizations
      - a. Formal organizations designed for special purposes
      - b. Informal groups or committees for other purposes
    - 3. Formal organized representation (within firm)
      - a. Structure
      - b. Procedure for organizing
  - C. Acting jointly
    - 1. Subjects
    - 2. Procedure for handling subjects
  - D. Arbitrating and mediating
    - 1. Voluntary, compulsory
    - 2. Inside, outside
    - 3. Administrative machinery
      - a. Boards of appeal
      - b. Joint committees
      - c. Special groups

USEFULNESS OF THIS CONCEPTION

Although several uses for this outline have probably suggested themselves, it may be well, nevertheless, to indicate briefly the chief uses to which it can be put.

Business Administration

This outline offers an orderly check-list of personnel functions and activities with the aid of which the general manager can make a survey of the personnel relations of his firm to see if it has a well rounded program. Personnel relations must be evaluated as a whole; and if a firm's activities are lop-sided, i.e., over-developed in some aspects and others minimized or entirely omitted, this check-list will readily bring these facts to the general manager's attention.

Further this outline furnishes the rough specifications for the personnel job in business, indicating the range, scope and detail of many aspects of personnel relations. The whole personnel job in business is usually broken up for administrative purposes into smaller units (in different combinations) depending on the various peculiarities found in each firm.

Because of this fact, the business executive in his own firm frequently is not able to see the significance and inter-relations of many personnel activities that appear when considered as a whole. By brushing aside the accidental administrative settings of any particular firm and by making them stand out as *functions*, the functional view helps the business executive to get a general view of the whole expanse of personnel relations.

The functional approach may also suggest liaison connections between administrative departments, or suggest changes in administration, but this conception has not been designed to serve as a basis for administrative organization.

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[1] This does not assume responsibility for administrating this function by management. The view here is simply an objective one, namely, that management acts with reference to all these things.

Research and Consulting Work

This paper indicates the scope and nature of a program for *general* research in personnel relations. It gives an outline of personnel activities which can be used as a basis for making "audits" of the personnel relations of different firms; and in this way it serves as a uniform basis for comparison: for getting the facts, for organizing, and for interpreting personnel data when brought together from many individual firms.

Presentation and Teaching

This conception of personnel relations will also be found useful in presenting or teaching the subject. It helps the layman and the beginner to get a general view of the field rather quickly and leads directly to specific problems. Even those engaged in personnel work will find this functional conception helpful in visualizing the field as a whole, and in organizing or reorganizing their thinking about personnel relations.

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The Constancy of Vocational Interest

By Harvey C. Lehman, *Ohio University*, and Paul A. Witty, *University of Kansas*

The determination of the exact nature of vocational interest is a major problem of the psychology of work. Neither a statement of interest nor a choice among interests may be interpreted as the literal equivalent of that complex factor, interest. Nevertheless, just such factual accounts as the authors here present of the occupational choices of children at varying age levels are invaluable,—not only as data for the fundamental enquiry but also as sign posts for the educator and the vocational counselor.

The following paper attempts to do two things: it summarizes the findings and the conclusions of several previous investigators of the permanence of vocational interest; and (2) it presents tabulated data of the choice of future employment in four diverse occupations secured from 7000 school children at each of the age level from 8.6 to 18.6. The authors then present some preliminary findings of a comprehensive study which has been made possible by a grant in aid from the Social Science Research Council.

HOW STABLE ARE CHILDREN'S INTERESTS?

ONE of the most crucial problems which confronts the counselor concerns itself with the permanence of children's interests. A counselor, having secured from a child his expression of a particular academic or occupational interest, is then confronted with the task of evaluating this statement. What are the motives which actuated the response? To what extent, if at all, does the report of a ten, twelve, or fourteen year old child represent a genuine and a lasting interest?

To be sure interest alone is an insufficient criterion upon which to base the selection of one's life work. The general ability, special talent, physique and health, educational accomplishment, social effectiveness, family circumstances and economic status of the youth must be weighed, and also the financial and non-financial rewards, and the relative demand and supply in the different occupations under consideration.

Among the various determinants of vocational success, the factor of general intelligence has perhaps received undue emphasis.[1] The ordinary test of intelligence has been found to correlate in most instances only loosely with vocational success or aptitude. Analysis of the army test scores showed that, although the median scores of the various occupational groups differed, the overlapping of ability among the members of the several groups was so great that it would be futile to attempt to use the intelligence test score singly as a criterion for vocational guidance. In other words, every normal individual has intelligence enough to enable him to attain a degree of success in numerous vocations. It may be that intelligence tests may be used profitably to determine the *range* of occupations to which children reared in normal American homes may aspire. However, the specific occupation which a given child chooses should be ascertained by some measure of his intrinsic interests as well as his general abilities and special aptitudes.

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[1] McCall in *How to Measure in Education* (pp. 179–180) states that a measure of intelligence is perhaps the *most important single* element to be used in vocational guidance.

The term "intrinsic interest" must not be confused with the child's passing fancy or temporary whim. The vocational counselor should evaluate the various interests of the child in terms of his ability and in terms of the individual or social values which accrue from following these interests in occupational endeavor. It is the function of the vocational counselor to seek out the various interests of the child, redirect or eliminate the undesirable ones, and turn desirable ones to good account.

EARLIER CONCLUSIONS

One of the earliest studies of permanence of interests was that of E. L. Thorndike in 1912. Thorndike secured data from 100 Barnard College students. Each student was asked to retrospect in regard to her interest and then to rank mathematics, history, literature, science, music, drawing, and handwork in order of her preference at various periods in her life, i.e. (1) in the last three years of the elementary school, (2) in the high school, and (3) in the university. The correlation between the degree of the student's alleged interest at ages 10–14 and at age 21 was over +.60. Although admitting that the validity of the method used in his study was open to question, Thorndike concluded at that time that it would be hard to find "any feature of a human being which was a much more permanent fact of his nature than his relative degrees of interest in different lines of thought and action." (1) p. 456.

From this it seems apparent that Thorndike assumed that his findings were approximately valid and of general application; yet he admitted that a better method of studying permanence of interests might be devised:

> "The better method is, of course, to get the measurements of relative interest and of ability, not from memory, but at the time; and not from individuals' reports alone, but by objective tests. Such an investigation requires a repeated survey of each individual at three or more periods, say, in 1912, 1915, and 1920, and demands skill and pertinacity in keeping track of the hundred or more children and arranging for the second and third series of reports and tests. I hope that some one of my readers will be moved to undertake it." (1) p. 456.

Although Thorndike suggested a valid method for studying permanence of interest, no investigator seems to have employed this method during the several years following his Barnard study. In 1917, Thorndike repeated his earlier experiment (2). This time he secured data from 344 college students. The resultant coefficients of correlation follow: elementary school interest and high school interest +.85; elementary school interest and college interest +.66; high school interest and college interest +.79. Regarding these data Thorndike made this statement:

> "On the whole I believe that the correlations given above are approximately what an omniscient observer of these persons would have found." (2) p. 179.

King and Adelstein repeated Thorndike's experiments at the University of Iowa; they secured data from 140 students (3). Although the coefficients of correlation obtained by these investigators are slightly lower than those secured by Thorndike, the results corroborate Thorndike's earlier studies.

The similarity of the coefficients of correlation obtained from these experiments in which the retrospective method was employed suggests that this method of approach yields rather consistent results. But the validity of such findings depends in part upon the validity of the retrospective method of studying interests.

A "superior method" suggested by Thorndike was employed by Willett (4). In Willett's experiment there was an attempt to eliminate the halo effect of childhood experiences upon memory reproduction. Willett studied the responses of approximately 300 high school pupils. Among others, the following questions were asked: (1) What subject that you have studied in high school or in the seventh or eighth grades do you most prefer?, (2) what is your second choice?, (3) what subject did you most dislike?, (4) what do you expect to make your life work?

The four questions were asked on March 23, 1916. Because the younger pupils seemed much more certain of their choices of future occupations than did the older ones, Willett thought that the replies of the younger subjects might be temporary choices only. He therefore repeated his study on March 23, 1917. Among his conclusions are the following:

> "The results are greatly in contrast to those reported from the experiments of recall on the part of college students." (4) p. 328.
>
> "Pupil interest in this group of approximately 300 pupils appears to have been decidedly lacking in permanence." (4) p. 330.
>
> "Advice given to pupils on March 23, 1916, for election on the basis of their then supposed occupational interests would have been misplaced in about four out of five cases for boys, and in at least one out of two cases for girls." (4) p. 330.

The questionnaire study was repeated a third time by Willett on March 21, 1918 (5) (6). In a later article, data are presented for 488 pupils. The data for 218 pupils (86 boys and 132 girls) cover a two-year period. Both the preferred and the most disliked subjects failed to show any marked constancy in the reports of the pupils. In discussing the permanency of subject preferences Willett states:—

> "For boys, permanence of preference for any subject seems decidedly lacking. In the case of every grade represented the per cent of boys choosing different subjects

> on all three occasions for both first and second choice far exceeds the per cent choosing the same subject for the three times." (3) p. 335.
>
> "Apparently this group of boys has not been permanently impressed by subjects either as preeminently interesting or on the other hand as distinctly uninteresting and unpleasant." (5) p. 336.

In regard to the permanence of occupational choices, the following statements are made:

> "For the entire group of boys, only 16 out of 86 or 18.4 per cent named the same occupation three times." (6) p. 366.
>
> "Permanence of interests both in school subjects and in future vocations is decidedly lacking for the majority of these 488 pupils." (6) p. 368.
>
> "If pupils, elsewhere are as varied in their interests from year to year, serious revision of the usual routine of election of courses needs to be made. If seventh and eighth graders are all as changeable as the ones reported herewith, election in the seventh and eighth grades surely offers a serious problem." (6) p. 368.

The above statements differ decidedly from Thorndike's conclusion that "the order of interests at twenty shows six tenths of perfect resemblance to the order from eleven to fourteen." If changes so marked as those found by Willett take place during a two-year period it may be that much greater changes would take place over a longer period of time.

Franklin reports the results obtained from some 1500 junior high school pupils of Baltimore who were asked in December 1922, to name the occupation that they would most like to enter (7). Follow-up questionnaires were filled out in May 1923, October 1923, and December 1923. Franklin drew the following conclusions:

> "The vocational interests of junior high school pupils show a very high degree of permanence over a period of at least one year,—and that a very critical one. Two children out of every three have the same preference at the end of the period as they had at the beginning." (7) p. 155.

It seems likely that "a very high degree of permanence over a period of one year" is not necessarily "permanence" of interest. The preceding conclusion must therefore be accepted with proper caution.

Franklin found that girls' occupational choices were much more permanent than were those of boys. Willett obtained similar results. Both investigators explain this sex difference as due to the greater restriction of occupational opportunities for girls. Since the girls choose from only a very limited number of occupations in the first place, they have less opportunity for change than do boys.

In June 1925, Franklin employed a follow-up questionnaire in three of the eight Baltimore schools which were first studied in December 1922 (8). Retarded pupils as well as the normally promoted ones were studied. Only 260 of the original 696 pupils from these three schools were studied in the second investigation. Apparently 63 per cent of the original group had been eliminated from school (or the investigation) within a period of less than three years. Regarding the survivors, Franklin states that:

> "Sixty-eight per cent of the boys and seventy-seven per cent of the girls or seventy-four per cent of the entire group, adhered to their original types of vocational interests throughout their junior-high school careers." (8) p. 439.

Franklin apparently assumes that his data indicate constancy of vocational interest and that similar constancy of interest existed among the 466 pupils who had dropped out of school for he states:

> "The vocational interests of pupils show a high degree of permanence during the junior high school period. After three years, three children out of four still adhere to their original type of vocational preference and three out of five still cling to the actual choices which they originally expressed." (8) p. 440.

Franklin seems to assume further that the interval of time between December 1922 and June 1925 (2½ years) is equivalent to any interval of time. He asserts that "time seems to have little or no effect upon the pupil who has made up his mind." (8) p. 440. It is of course very doubtful that Franklin's conclusions are valid. When five out of eight pupils are eliminated during the junior high school years, it is questionable that the remaining pupils are typical of the entire group. Moreover, the discovery that three children out of five cling to the vocational preference expressed two and one-half years previously is no proof of permanence of interest (8).

It would naturally be supposed that older students would manifest greater stability of occupational choice than younger ones. If, as Thorndike, King, Adelstein, Franklin, and others assert, interests are relatively permanent, one would surely expect college students to manifest considerable stability of vocational interest. In this connection McHale's study is pertinent (9). McHale studied 133 Goucher college women (juniors) in January 1922. These students were given a list of vocations open to college women and each was asked to underline five occupations in order of preference. In January 1924, a follow-up questionnaire was sent to each individual who had taken part in the earlier investigation. Choice of vocation was relatively unstable. During the two year period 24.8 per cent changed their first choice and 40.6 per cent changed their second choice. At the time of the second investigation only 24 per cent reported that they were pursuing their first choice; 27.8 per cent reported that they were pursuing their second choice, and 20.3 per cent reported that they were pursuing vocations not listed in their original reports. McHale points to the fact that some of these women are probably still uncertain as to their permanent selections and that, whether they are or not, report is probably not a very reliable or constant index of vocational interest.

The study of Proctor throws some additional light on the problem of permanence of interest. (10) pp. 66 ff. Proctor studied the vocational ambitions of 930 pupils in eight high schools. He found that over 60 per cent of the high school pupils aspired to join the ranks of the professional class while, according to the United States census, less than 5 per cent of the gainful workers of the country belong to that class. Even though it be admitted that the high school represents a rather highly selected group of young people, it is clear that 60 per cent of these students could not find places for themselves in the professional field.

In commenting upon his findings Proctor observed that vocational opportunities, as shown by the United States census reports, are just above the reverse of the distribution of high-school pupils' occupational choices. For example, it was found that, although agriculture and the mechanical and industrial arts engage the energies of 61.1 per cent of the gainful workers in the United States, only 8.8 per cent of the high-school pupils had ambitions looking toward these fields. (10) p. 66.

Proctor's study evidences the fact that sheer lack of opportunity will probably compel many high school pupils to take up occupations other than those preferred. Proctor's findings are substantiated by those of Douglass whose questionnaire of vocational interest was filled out by 1,658 girls and 1,186 boys (11). All were high school seniors. Douglass found that 51.2 per cent of the girls graduating from small high schools expected to take up teaching as a life work, and that 30.2 per cent of the boys were planning to enter upon engineering as a life work. Duglass remarks that "it does not seem reasonable that 51.2 per cent of the girls who graduate from the small high school and who voluntarily select teaching are fitted for it; nor that 30.2 per cent of all the boys who graduate from all classes of high schools are capable of becoming engineers." (11) p. 80.

If anything approximating permanence of vocational interest be a fact, the following results could not be valid:

> "Eighty-five per cent of this group of 2,844 girls and boys had made their choice of vocation within three years, and approximately 50 per cent within two years. In answer to a direct question 54.6 per cent specified a different calling that they had, sometime in the past, decided upon. . . . . Boys and particularly girls had renounced former decisions and turned to business pursuits in large numbers." (11) p. 82.

The results of Douglass do not stand alone. It has been found over and over again that pupils of junior and senior high school ages are ambitious to enter occupational fields in which they simply would not be able to obtain placement. Schrammel has summarized several studies.

> "In a survey made by the Board of Education in Detroit of the occupational choices of 581 eleven and twelve year old boys, 64 per cent chose five occupations; 83 per cent chose ten different occupations; and 74 per cent selected occupations in the professional group. . . . .
>
> "In the Illinois survey of high school seniors, to which reference has already been made, over 30 per cent of the boys chose engineering, whereas, according to the United States census less than one per cent of the men over eighteen years of age of the country are engaged in occupations involving engineering. . . . .
>
> "In the Indiana survey of high school seniors made by Book a few years ago, engineering was equally popular as a prospective career as was the case among the Illinois high school seniors. It was selected by over 31 per cent of the boys. In Wisconsin, in a canvass of 15,263 school students of 54 different schools respecting their vocational choices Schmidt found that 33 per cent of the boys had chosen professional occupations, and in Illinois, Indiana, and Massachusetts, practically 50 per cent of the senior boys chose professional occupations, whereas, as already stated, only five per cent of the adult male population is engaged in such professions." (12) p. 216.

It is obvious that, whether or not their choices change, the high school boys of the above states would find it necessary to enter occupations other than those they prefer. It may not be change in preference, but in opportunity that effects such results. However, there is some evidence which suggests that the choices and the preferences of pupils change from year to year. This gradual modification is revealed both in the findings of Willett and McHale and in those about to be presented.[2]

TABLE 1

Number of individuals included in an investigation of vocational attitudes (1927)

AGES	GIRLS	BOYS
8½	259	203
9½	358	349
10½	372	403
11½	375	387
12½	372	392
13½	346	365
14½	391	361
15½	322	324
16½	299	251
17½	156	162
18½	36	57
Totals......	3286	3254

THE TOPEKA STUDY

From a comprehensive and catholic list of 200 occupations over 7,000 school children of Topeka, Kansas, were asked to check only those in which they would be willing to engage as a life work.[3] The same children later were asked to indicate: (1) The three occupations which they would like best to follow; (2) the one occupation which they most likely would follow; (3) the three occupations which they judged to be the best money-makers; (4) the three occupations which they thought to be most respected; and (5) the three occupations which they thought would require the least work. Specific directions were given; the teachers coöperating in the experiment were instructed in order that the results of the investigation might be reliable and, the data were obtained from unselected children.

TABLE 2

Percentages of children who reported that they would be willing to be cowboys and cowgirls

AGES	BOYS	GIRLS
8½	64	7
9½	64	5
10½	61	7
11½	49	3
12½	38	3
13½	38	4
14½	24	3
15½	14	3
16½	10	1
17½	5	2
18½	4	0

There were, as was to be expected, a representative sampling of occupations. Endeavors as widely different in nature as "cowboy," "aviator," "stenographer," and "movie actress," were included. This paper is limited to a presentation of the reports of the children regarding their interests in these four occupations. These are chosen because they represent to a fair degree the tendencies of the children in their reports. "Cowboy (or cowgirl)" was chosen because the responses of the children to this item exemplify the very prevalent tendency of the children to change their occupational choices from time to time. "Aviator" is another item which was selected for study. A marked change in attitude on the part of the Topeka children is revealed in their responses to this item. "Stenographer" and "movie actress" were chosen because the girls change markedly in their attitude toward the desirability of following these types of endeavor. The attitude of the girls toward these occupations is a product of many variables; one of importance is opportunity.

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[2] The present study includes some preliminary findings of a more comprehensive study that has been made possible by a grant in aid from the Social Science Research Council.

[3] The writers are indebted to Sup't. A. J. Stout and to Mr. J. F. Kaho for assistance in securing these data.

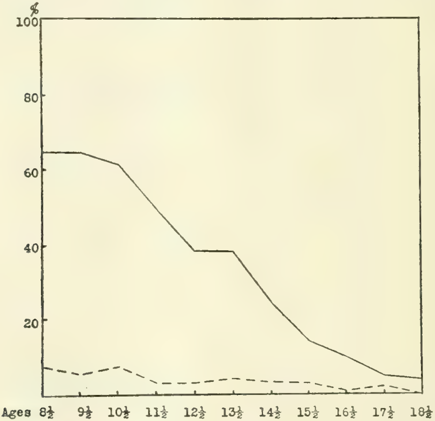

FIG. 1. PERCENTAGES OF CHILDREN OF VARIOUS AGES WHO REPORTED THAT THEY WOULD BE WILLING TO BE COWBOYS OR COWGIRLS

Boys ——— Girls ----------

RESULTS

Data were assembled separately according to sex. Tables were then prepared showing the percentage of children in each age group who reported that they were willing to engage in each occupation as a life work.

Figure 1 and table 2 show the percentage of children of various ages who reported that they would *be willing* to be cowboys and cowgirls. With increased maturity it is clear that fewer boys and girls are willing to engage in this type of work as a life occupation. It seems reasonable that the boys who are now eight and ten years of age will change in attitude as they become more mature and that this change in attitude is represented with a fair degree of accuracy by the lines in figure 1. The validity of this hypothesis will of course need to be substantiated by follow-up investigations. The foregoing assumption seems to the writers to be more reasonable however than the contrary assumption, *i.e.* that the eight and ten year old boys included in the present study will manifest relative permanency of interest in this occupation.

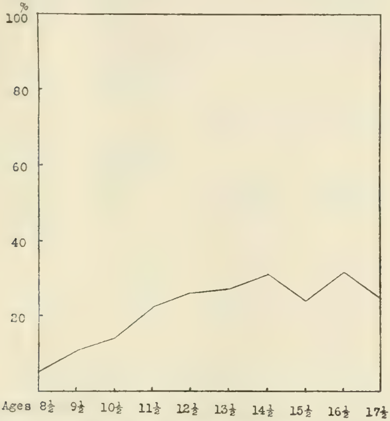

FIG. 2. PERCENTAGES OF GIRLS OF VARIOUS AGES WHO REPORTED THAT THEY WOULD LIKE BEST TO BE STENOGRAPHERS OR TYPISTS

Figure 2 and table 3a show the percentages of girls of various ages who reported that they would *like best* to be stenographers or typists. It will be noted from figure 2 and table 3a that at the youngest age level (age 8½) only five per cent of the girls thought that they would like best to be stenographers or typists. At ages 14½ and 16½ on the other hand more than 30 per cent of the girls checked this occupation as one of the three occupations in which they would most like to engage. It is clear that change rather than permanency of interest is indicated by figure 2 and table 3a.

The situation is similar as regards figure 3 and table 3b. Figure 3 and table 3b show the percentages of girls of various ages who thought that they would *like best* to be movie actresses. With increased maturity there is a decrease in the percentage of the girls who reported that they would like best to engage in this occupation. This change of attitude may be due to the operation of the sour grapes mechanism; on the other hand it may be due merely to developed understanding and superior judgment.

Figure 4 and table 4a show the percentages of boys of various age levels who reported that they would *like best* to be aviators. This curve seems to be at its maximum height from ages 12½ to 14½ inclusive. However, even at age 17½ more than 18 per cent of the boys checked this occupation as one of the three occupations in which they would most like to engage. This finding may be due in part to the fact that the Occupational Attitude Quiz was administered five months after Lindbergh had made his flight to Paris.

TABLE 3

Percentages of girls of various ages who reported that they would like best to be: (a) stenographers or typists and (b) movie actresses

AGES	(a) STENOGRAPHERS OR TYPISTS	(b) MOVIE ACTRESSES
	per cent	*per cent*
8½	5	20
9½	11	20
10½	14	29
11½	22	22
12½	26	17
13½	27	19
14½	31	10
15½	24	6
16½	32	5
17½	25	3

Figure 5 and table 4b show the percentages of boys of various ages who thought that they would *like best* to be cowboys. At age 8½ thirty-eight per cent of the boys reported that they would like best to be cowboys. At age 16½ not one per cent thought so. Here again it is obvious that a change in vocational ambition occurs. Permanency of this sort of interest does not seem to be the rule.

The preceding data are suggestive only. But they do lead one to conclude that the term "permanence" and the term "interests" are in need of precise definition when used in studies of vocational preference. There are many degrees of permanence and innumerable types of interests. It will be readily granted that some interests are relatively permanent. Among such may be the individual's interest in food, clothing, shelter, etc. Other interests such as interest in sex, religion, friends of childhood, and certain forms of play, are probably less permanent. The writers have previously discussed the very human tendency to hasty generalization and oversimplification (13). Certainly, it would

TABLE 4

Percentages of boys of various ages who reported that they would like best to be: (a) aviators and (b) cowboys

AGES	(a) AVIATORS	(b) COWBOYS
8½	6	38
9½	13	26
10½	18	34
11½	21	27
12½	24	16
13½	19	11
14½	24	7
15½	18	1
16½	14	0
17½	18	0

seem that a generalization such as "It would indeed be hard to find any feature of a human being which was a much more permanent fact of his nature than his relative degrees of interest in different lines of thought and action," (1) p. 456, is hardly justified.

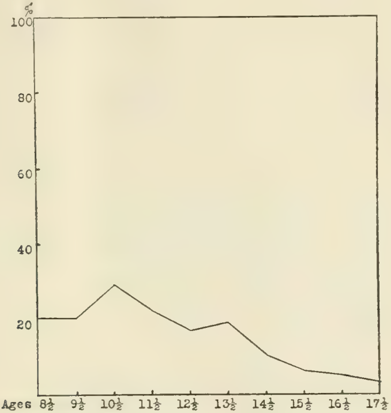

FIG. 3. PERCENTAGES OF GIRLS OF VARIOUS AGES WHO REPORTED THAT THEY WOULD LIKE BEST TO BE MOVIE ACTRESSES

At this point it may be well to return to the conclusions set forth by Franklin to which reference has already been made. Franklin asserted that he had discovered a very high degree of permanency over a period of one year; that two children out of every three clung to the same vocational preference at the end of the year that they had at the beginning. In this connection let us inspect the boys' data as represented in figure 1. At age 13½ thirty-eight per cent of the boys asserted that they would like to be cowboys. At age 14½ twenty-four per cent of the boys made this assertion. If the graph as here shown represents the situation as it will exist from year to year it may be asserted that approximately two-thirds of the 13½ year old boys who want to become cowboys will continue to cling to this notion one year hence. To this extent the present findings corroborate those of Franklin. However, it is clear that over a longer period of years this finding would not be significant.

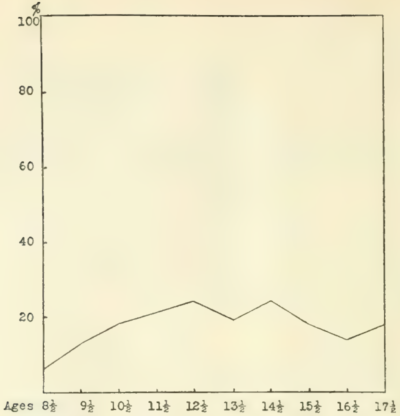

FIG. 4. PERCENTAGES OF BOYS OF VARIOUS AGES WHO THOUGHT THAT THEY WOULD LIKE BEST TO BE AVIATORS

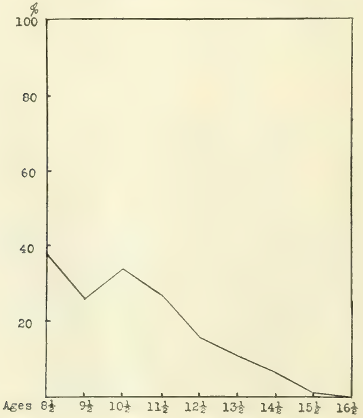

FIG. 5. PERCENTAGES OF BOYS OF VARIOUS AGES WHO REPORTED THAT THEY WOULD LIKE BEST TO BE COWBOYS

Between ages 8½ and 18½ the percentage changes from 64 to 4. It therefore seems illogical to base conclusions upon a study that continues only for a year or two. The writers are here assuming that the present 8½ year old children would respond next year as do the 9½ ones, etc. The validity of this assumption they are at the present time investigating. Several follow-up studies are under way to test the reliability of the children's reports. However, it seems logical to assume that groups of 8½ year old children will respond next year as 9½ children now respond provided that the children live in a conservative city, one not affected appreciably by a shifting population.

REFERENCES

(1) THORNDIKE, E. L.: The Permanence of Interests and Their Relation to Abilities. *Pop. Sci. Mo.*, 1912, *81*, 449–456.

(2) THORNDIKE, E. L.: Early Interests: Their Permanence and Relation to Abilities. *Sch. and Soc.*, 1917, *5*, 178–179.

(3) KING, I., AND ADELSTEIN, M.: The Permanence of Interests and Their Relation to Abilities. *Sch. and Soc.* 1917, *6*, 359–360.

(4) WILLETT, G. W.: Permanence of Pupil Interests. *Sch. and Soc.* 1918, *7*, 325–330.

(5) WILLETT, G. W.: Permanence of Pupil Interests. *Sch. and Soc.* 1919, *9*, 334–336.

(6) WILLETT, G. W.: Permanence of Pupil Interests. *Sch. and Soc.* 1919, *9*, 365–368.

(7) FRANKLIN, E. E.: The Permanence of the Vocational Interests of Junior High School Pupils. *Voc. Guid. Mag.* 1927, *5*, 152–156.

(8) FRANKLIN, E. E.: The Permanence of Vocational Interests After Three Years. *Sch. and Soc.* 1926, *23*, 438–440.

(9) MCHALE, K.: An Experimental Study of the Vocational Interests of a Liberal Arts College Group. *Jour. of Appl. Psy.* 1924, *8*, 245–255.

(10) PROCTOR, W. M.: *Psychological Tests and Guidance of High School Pupils.* Bloomington, Ind.: Jour. of Edu. Res. Monographs No. 1. 1923. Public School Publishing Co. 125 pp.

(11) DOUGLASS, A. A.: Vocational Interests of High School Seniors. *Sch. and Soc.* 1922, *16*, 79–84.

(12) SCHRAMMEL, H. E.: Factors in a College Man's Choice of a Career. *Voc. Guid. Mag.* 1927, *5*, 214–218.

(13) WITTY, P. A., AND LEHMAN, H. C.: Some Dangers of Over-Simplification. *Edu. Rev.* 1928, *75*, 150–161.

Manuscript received October 22, 1928

Vocational Intentions of "Mortar Board" Seniors

By Mary Margaret Kern, *Lafayette, Indiana*

This report on vocational intentions of a highly selected group of young college women has been prepared by the editor of Mortar Board Quarterly from statistics compiled by Irene E. Rems.

Representative college women are entering the world of business whether they need the money or not. A survey of 281 Mortar Board seniors in 33 colleges secured information as to their attitude towards choice of a career, financial aspects of that choice, and their appraisal of their own qualifications for occupation. This gives a cross section of representative opinion which points to the need for developmental work in personnel practice among girls in American colleges.

TO ASCERTAIN the senior college girl's attitude toward business, Mortar Board, national senior college honorary society for women, was chosen as the field for a survey. Mortar Board, at the time of this study, was represented in 38 of the leading colleges of the United States. These colleges are located from coast to coast, and far into the north and southlands. Girls eligible for Mortar Board are elected during the last half of their junior year by the senior members. These women are chosen on the basis of excellence in scholarship, leadership and service. No girl may become a member of Mortar Board if she has only one of these three requisites. She must be an outstanding campus leader, so the group represents the best all-round girls of university life. With high scholastic averages, they hold offices and responsible positions in campus organizations, and give great promise of future achievement.

Miss Irene E. Rems of Philadelphia, formerly national vice-president of Mortar Board, conducted the survey in connection with personnel work, which is the national project of the organization.

The girls questioned in the survey are those who graduated from college in June 1928, and who are having their first taste of business this current year. This report indicates the fields they intended to enter the first year after college, and does not mean that these same girls do not plan to be homemakers eventually.

The following questionnaire was distributed:

1. What are you planning to do after graduation?
2. Do you expect to earn your own living?

3a. Is it an immediate necessity that you earn a fair salary?

b. Will you just look for the most interesting thing you can find?

c. Have you already a definite career in mind?

4. If you plan to get a job, how will you try to find what you want: college or commercial employment bureau...... routine application......personal introduction......other methods (specify)

5. Have you any specific qualifications to "sell" to a prospective employer: specialized training (bacteriology, etc.)......stenography...... experience......aptitude......any other?

6a. What initial salary will you ask for?

b. What is the least you will take?

Answers were received from 33 out of 38 chapters of Mortar Board; from 281 girls out of a possible 345. The chapters ranged in size from five members in several groups to seventeen members in one group. Most chapters have about eight or nine active members. Miss Rems tabulated results in two ways. One reports the summary totals of all answers to the six questions; the other indicates how each individual school reported on different questions. The following figures were taken from the summary of answers from all schools.

1. What are you planning to do after graduation? Only eight girls out of the entire number answering the questionnaire stated that they intended to be married immediately. Nearly half of the group intended to be teachers,—133 to be exact. Thirty of them planned to pursue graduate work; three were going to law school. Eleven had selected secretarial work. Ten made specific choice of newspaper or advertising work, and seven others chose journalism. Seven indicated social work as their choice; six indicated their preference as "work." Four wanted library positions; three wished to follow a musical career; three preferred department store training. Theatrical publicity, or coaching debates, work in the personnel department of a mercantile institution attracted two girls each. Some twenty-five vocations had only one adherent apiece, among them stenography, psychiatric work, church and camp work, commercial art, dietetics, girl scout work, dramatics, consular service, social science, retail research, interior decorating, tea room management, government office work, medicine, buying, and physical education. Six girls were undecided as to a career. Only one of the 281 stated that she was not going to work, while two others were going to travel.

2. Do you expect to earn your own living? Two hundred and forty-seven of the 281 answered 'yes' to this question; less than seven per cent answered 'no;' eight answered 'partially,' three 'eventually,' and five gave no answer.

3a. Is it an immediate necessity that you earn a fair salary? Over half the group designated such a necessity while a little less than forty per cent answered negatively. Four responded 'not at present;' three with 'eventually,' and one 'does not intend to do anything.' Thirteen did not answer.

3b. Will you just look for the most interesting thing that you can find? The answers to this question were varied, with about half the group again answering in the affirmative, and ninety-three saying 'no.' One had 'scouting in mind,' another considered 'interest and salary.' One relied on 'best thing fitted to do,' one said 'not exactly,' and one said 'probably,' while another 'does not intend to do anything.' There were no answers from thirty-six.

3c. Have you already a definite career in mind? About two-thirds of the group answered 'yes' to this question, and less than one-third 'no.' One had the 'idea in nucleus'; one said 'more or less'; one said 'fairly'; one 'does not intend to do anything'; one answered 'yes and no,' while eighteen gave no answer.

TABLE 1

Summary of replies to a vocational choice questionnaire

ANSWER	QUESTION 2	QUESTION 3A	QUESTION 3B	QUESTION 3C
	Do you expect to earn your own living?	Is it an immediate necessity that you earn a fair salary?	Will you just look for the most interesting thing that you can find?	Have you a definite career in mind?
Yes	247	150	145	178
No	18	110	93	80
Miscellaneous	11	8	7	5
No answer	5	13	36	18

4. If you plan to get a job, how will you try to find what you want? Several methods were suggested by most of the girls including such plans as applying to the college bureau (135), to a commercial bureau or teachers agency (43), personal introduction (139), direct application and personal interview (72), personal friends (5), and letters from professors (4).

Each of the following were listed by just one individual: Camp; Dean of Women; YWCA; Dean of Music; through school for personnel work; will open own office; family connection; has position in private school secured through friends.

5. Have you any specific qualifications to "sell" to a prospective employer? These are too diversified and too detailed to repeat in full, as the qualifications mentioned are largely the usual college honors and degrees. The girls signified the subjects in which they have majored, intending, of course, to use them as preparation for the line of work which they hope to follow. Many of them have received high scholastic honors and college honors from their extra-curriculum work as well. But only a few have had actual experience in any line of employment. One tells of eleven years' experience in scout work, camp counseling and troupe work; another has had three summers' experience in teaching dancing and other work with children, coaching plays and pageants; several have had business school training; one has had two years' hospital social service training; some have taught schools; one states her best qualification as 'aptitude.' Some of the other list their education as follows: Four years' specialized training in painting and illustration; three months' training in dietetics at a hospital; four years' training in secretarial studies; four years' course in Costume Economics; summer camp work for six years. One will open her own office; another has a History major, and admits her 'splendid executive ability'; another, more practical, says she has a 'fair college record in English major and Latin minor, also willingness to work.'

Twenty-two admitted that they did not feel that they had any qualifications with which to sell themselves to a prospective employer.

6a. What initial salary will you ask for? The lowest initial salary mentioned was $936 a year, and the highest amount was $2600. There were only ten individuals mentioning sums below $1200, and twenty who wanted $1200 for a beginning annual salary. Ten named $1300; eleven, $1400; thirty-one, $1500, while fifty-six specified $1800. There was at least one individual asking for nearly every figure between $1200 and $1800, and there were twenty-five above $1800, five of these designating $2400 as initial salaries, and one asking $2600, the highest sum mentioned.

Of those who did not indicate an actual sum, five stated that it would depend on the work and on the experience to be gained; nine were undecided; one was willing to let her first employer decide what he thought she was worth; two had no ideas on the subject at all; one felt that the salary should vary with the type of work; one decided to ask for the least salary to be gotten; another will accept what she can get; one found it inadvisable to answer; four didn't know; one already had her position; and fifty-seven did not answer.

6b. What is the least you will take? These answers varied from $900 up to $2080. Twenty-two are unwilling to accept less than $1200; ten not less than $1300, thirty-four not less than $1500, six not less than $1620, five not less than $1680, twelve not less than $1800. Only three went higher than $1800. One of these stating $2000 as her lowest salary, and two choosing $2080. The rest of the salaries mentioned vary in odd sums between the high and low points. One declared herself as insisting upon a 'living wage' but did not specify what she thought that would be; one still clung to the idea of receiving the least to be gotten.

CONCLUSIONS

An analysis of the foregoing facts and figures reveals some interesting conclusions:

Choice of occupation (Question 1). Teaching still continues to be the most popular profession for this selected group of college girls, and more are training to become teachers than for any other profession. Nevertheless, those who are not decided upon teaching will not admit that the door to any vocation or profession is closed to them, as evidenced by the fact that over forty other occupations, from theatrical work to consular service, are mentioned. An exceedingly small percentage of girls choose to marry immediately upon graduation.

Qualifications for occupation (Question 5). Although the girls answering the survey are conceded to be among the very best on the campus, their qualifications, which would be of commercial value, are few. In most cases, of necessity they are of a general character, consisting largely of scholastic ability. Few of these leading seniors expect to heed the advice of many business women to use stenography as a stepping stone to a successful career.

Financial aspects of occupations (Questions 2, 3a, 6a and 6b). The majority of college seniors plan to support themselves upon graduation, whether they need to earn money or not. Due to the fact that college girls have been told so many times about the advantages of a college education and the higher earning capacity it gives one, their ideas of beginning salaries are most utopian, utterly beyond anything they could probably receive at first. Some few take a sensible view of the situation and state their willingness to work for a small wage in order to get a start in their chosen occupation, but the majority, by setting an arbitrary figure may destroy their chances for the job.

How to find a job (Questions 3b, 3c and 4). College seniors have a fairly definite idea about the general methods to employ in searching for a job; but they do not know how to go about it specifically and thoroughly.

General conclusions. It is difficult to forecast just how many of the preferences expressed by the girls will be actually carried out, but it is safe to say that more than a few will discover that wishing to find a job in a certain occupation and really securing it are two different things.

Personnel and vocational guidance can help these girls to carry out their desires by counseling, advising what preparation is necessary and assisting them in a concrete way to realize their ambitions.

Though the percentage of those who have decided upon their work is encouragingly large, the number of those still undecided in their senior year indicates a necessity for more concrete vocational guidance.

All indications point to the fact that representative college women are entering the business world.

A second survey of Mortar Board seniors, covering those who are in school for this year, 1928–1929, will be made by Miss Rems, and results compared with the present tabulation.[1]

(*Manuscript received March 21, 1929.*)

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[1] Mortar Board, under the leadership of Mrs. A. C. Ramier of Indianapolis, Indiana, head of national personnel work for the organization, wishes to serve, not only its own members, but all college women about to enter business and professions. This work is being carried on in coöperation with Deans of Women at the various schools. It has included such activities as establishing a vocational library; bringing speakers on vocations to the campuses; keeping personnel records of all girl graduates with regard to vocations; and making a survey of employment agencies and opportunities for women in the large cities of the United States. The vocational problems brought out by this survey are among those which Mortar Board is helping to solve.

News Notes

PERSONNEL RESEARCH FEDERATION

Activities of Member Organizations

United States Bureau of Mines[1]

Work of the Health and Safety Branch: Report Submitted by R. R. Sayers.[2]

During the year ended June 30, 1929, the health and safety branch of the U. S. Bureau of Mines, conducted a number of studies of interest, from the viewpoint of health and safety, to the personnel of various industries, particularly the mining, metallurgical, and petroleum industries. The most important of these are summarized as follows:

HEALTH DIVISION. *Carbon monoxide.* The last report described the physiological effects of repeated daily exposure of several hours to small amounts of carbon monoxide with special reference to the safety and comfort of the general public in passing through the Holland Tunnels. This study was continued, but with particular emphasis on the effect of prolonged daily exposure to carbon monoxide such as traffic officers or maintenance men might experience. The investigation was carried out in coöperation with the New York State Bridge and Tunnel Commission and the New Jersey Interstate Bridge and Tunnel Commission. The results have been published in *Public Health Bulletin No. 186.*

Alkyl halides used as refrigerants. An investigation of the effects on animals of repeated daily exposure to low concentrations of methyl chloride was undertaken. Results of previous work dealing with acute poisoning from a single exposure were published in *Public Health Bulletin No. 185,* under the title "Physiological response attending exposure to vapors of methyl bromide, methyl chloride, ethyl bromide, and ethyl chloride," and *Public Health Reports,* vol. 43, No. 35, under the title "Microscopic pathology attending exposure of guinea pigs to vapors of ethyl bromide."

Warning agents for manufactured gas. The survey of possible substances, measurement of intensity of warning properties, and investigation of chemical stability and corrosion were completed during the previous year. During 1928–1929, field tests were conducted in the city distribution systems of Davenport, Iowa, and Linton, Ind., and a report giving the summarized results of the investigation was prepared and submitted to the American Gas Association. A complete report of the investigation is being prepared for publication.

Approval of gas masks. Testing of gas masks and hose masks for the purpose of establishing a list of equipment for respiratory protection that will meet the requirements of a safe device was continued.

Some interesting facts in regard to poisonous gases were discovered in connection with the testing of gas masks. The danger of poisoning by absorption was forcibly brought to the attention of those engaged in testing gas masks for their efficacy in protecting against hydrocyanic acid gas. In this particular instance three men were wearing gas masks in an atmosphere containing approximately 2 per cent hydrocyanic acid gas, and the masks were giving excellent respiratory protection. After eight or ten minutes, however, the men felt symptoms of marked dizziness, weakness, and throbbing pulse. They immediately left the poisonous atmosphere and were just in time to avoid collapse and unconsciousness. Marked weakness and high pulse rate together with headache persisted for several hours after exposure, and the men were incapacitated for two or three days; recovery was apparently complete at the end of that time. In view of this experience, it seems advisable to decrease the maximum concentration of hydrogen cyanide gas for which the masks will be approved. In tests of masks for hydrogen sulphide, it was found that the canisters would protect for relatively short periods against 3 or 4 per cent hydrogen sulphide, but that the heat of reaction is so great that it would be impracticable and unsafe to use them in such high concentrations. When using 4 per cent, the canister became red hot. Tests using methyl chloride have been added to the regular schedule because the particular type of mask undergoing approval testing may be used for gases encountered in the refrigeration industry.

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[1] Published by permission of the Director, U. S. Bureau of Mines. (Not subject to copyright.)

[2] Chief surgeon, U. S. Bureau of Mines; surgeon, U. S. Public Health Service.

Toxic gases and vapors. Investigations pertaining to the physiological and pathological action of gases and vapors were made to obtain information necessary for promoting health and safety in the production and utilization of industrial products. A comparative study was begun in connection with the tendency of nitroglycerin and ethylene glycol dinitrate to cause discomforting headaches in the ordinary practice of handling these compounds as explosives. The study included the effect on persons of absorption of the liquid through the skin and of vapors through the lungs. The effect on blood pressure and the lethal dosage were determined on animals. The study has not yet been completed.

Physiological effects of dusts. Investigation of the suitability from the physiological standpoint of various dusts used in rock-dusting coal mines was continued by studying the effect on guinea pigs of intraperitoneal injections of suspensions of the dust. The work will be continued during the coming year along similar lines, with the possible inauguration of a study in which animals will be exposed to dust-laden air for the purpose of ascertaining whether the results of injection tests, as manifested in the tendency to form abdominal adhesions, are borne out by the occurrence of fibrous tissue in the lungs.

Physical examination of miners. The work of the Bureau of Mines clinic, carried on at Picher, Okla., in coöperation with the Tri-State Zinc and Lead Ore Producers Association and the Metropolitan Life Insurance Company, was continued. Four acting assistant surgeons, with other personnel, were detailed to the work. During the year, 9,208 examinations were made, and tabulation of the histories up to and including June 30, 1928, was completed.

SAFETY DIVISION. *First-aid and mine-rescue instruction.* During the fiscal year a total of 81,509 miners, quarrymen, oil and gas workers, and employees of metallurgical plants were trained by the safety division of the U. S. Bureau of Mines in the principles of first-aid and mine-rescue methods.

Advanced safety instruction. Certificates in the advanced instruction course, which is designed to teach correct mine-rescue organization and methods of application of such organization at mine disasters and which is much more technical than the ordinary first-aid and mine-rescue training, were issued to 727 persons.

Joseph A. Holmes Safety Association. One of the most extensive of the coöperative activities of the bureau is that of guiding the Joseph A. Holmes Safety Association and the Holmes Safety Chapters. At the annual meeting of the Joseph A. Holmes Safety Association on March 5, 1929, there were awarded five gold medals, three silver medals, and 26 diplomas to mine employees for heroic services performed. There were also awarded nine certificates of honor to companies and two to individuals for meritorious safety records. The safety division made arrangements for the presentation of these medals and certificates, in most cases at a public gathering.

A monthly mimeographed publication is issued which is known as the *Holmes Chapter Notes*; this publication gives approximately 5,000 words monthly on various phases of safety work both outside of and within the Holmes Chapters. At the present time there are 70 active chapters in the Holmes Safety Association, the purpose of which is to promote the health, safety, and welfare of miners and their families.

National Committee for Mental Hygiene

The National Committee for Mental Hygiene in 1929 extended its previous efforts to relieve part of the serious shortage of trained personnel (chiefly psychiatrists) by awarding an increased number of fellowships. These fellowships of twelve months' duration are designed to equip physicians who already have had some basic training in psychiatry for clinical positions in the fields of child guidance, industry, education, etc. During 1929 five such fellowships have been awarded.

The year also witnessed renewed activity in the field of mental hygiene work among college students. At the present time at least fourteen major colleges and universities regularly avail themselves of the psychiatric services of specially trained student counselors who deal largely with undergraduate maladjustments.

As a prelude to the formulation of a complete city-wide program of mental hygiene for New York City, The National Committee for Mental Hygiene undertook an exhaustive study of mental hygiene facilities and needs in this city. The highly valuable data disclosed makes possible for the first time the construction of an intelligent rehabilitation program.

Twentieth Anniversary of Mental Hygiene Movement

The twentieth anniversary of the inauguration of the mental hygiene movement and the founding of The National Committee for Mental Hygiene was celebrated on Thursday evening, November 14, with a dinner at the Biltmore Hotel in New York City attended by nearly 700 psychiatrists, psychologists, educators, social workers and prominent laymen from various parts of the country, and presided over by Dr. William H. Welch, Director of the Department of the History of Medicine of Johns Hopkins University and Honorary President of the National Committee.

Addresses were made by President James R. Angell of Yale University, Dr. William A. White, Superintendent of St. Elizabeth's Hospital, Washington, and Dr. Frankwood E. Williams, Medical Director of the National Committee, all of whom paid tributes to Mr. Clifford W. Beers, author of *A Mind that Found Itself*, the publication of which twenty-one years ago led to the organization of the National Committee for Mental Hygiene and some twenty affiliated state societies, the recently formed American Foundation for Mental Hygiene, and the preparations now in progress for the First International Congress on Mental Hygiene to be held in Washington next year.

Mr. Beers described the events incidental to the establishment in 1903 at the home of Anson Phelps Stokes in New Haven, Connecticut, of the pioneer Connecticut Society for Mental Hygiene, from which the national movement grew, and reviewed the development of the work to the present time.

Discussing the beginnings of the mental hygiene movement, in terms of the work for the amelioration of conditions among the insane, Dr. White said: "For a hundred years patients had been leaving our public institutions for mental disease with a sense that if they had gotten well they did not owe it to the way they had been treated. This is a mild way of putting it. In numerour instances they must have felt outraged at the experiences they looked back upon, at the cruelty, the callousness, the lack of sympathy with which they had been confronted during their confinement. But it was given to only one man who had had similar experiences to have these memories of his treatment strike deep to the very core of his being, and there, instead of rankling and making him resentful, they took root and grew and produced the fruit which is now the mental hygiene movement.

President Angell described the mental hygiene work that is being done at Yale University to relieve students of mental stress, build up healthy emotional and mental attitudes, and prevent mental and nervous breakdowns.

Dr. Charles P. Emerson of Indianapolis was reëlected President of the National Committee at its twentieth annual meeting in the Biltmore Thursday afternoon. All other officers were reëlected with him, including Vice Presidents James R. Angell, the Right Rev. William Lawrence of Boston, Dr. William L. Russell of White Plains and Dr. Bernard Sachs of New York. Frederic W. Allen, Treasurer, and Clifford W. Beers, Secretary, were also chosen to succeed themselves.

Dr. Frankwood E. Williams and Dr. George K. Pratt, assistant medical director of the Committee, stressed the need for trained workers and psychiatrists in the mental hygiene field. A partial report of preparations being made for the reception of the First International Congress on Mental Hygiene was rendered by John R. Shillady, administrative secretary of the Congress. Dr. George S. Stevenson, director of the Division on Community clinics, traced the growth and development of community and child guidance clinics in the United States.

Personnel Research at Stanford

The administration of the college aptitude test program followed by tabulation of results and comparisons with scholarship records has continued as a major project during 1928–29. Again Mills College has joined in the test program by asking their candidates for admission to take the examination at the Stanford centers. The test centers made available for applicants were increased in number by the addition of five various communities east of California. The locations were selected on the basis of numerous inquiries for admission materials from those districts. These included Cleveland, Denver, Ithaca, Minneapolis, and St. Louis. This makes a total of 12 centers outside of California and 33 within the state.

Three junior college districts requested and were provided with special testing service at cost in the form of aptitude test scores for their students. The cases handled included:

Kern County Junior College	118
San Mateo Junior College	419
Yuba County Junior College	125

The total number of tests given was 2318, of which 1656 were in connection with applications for admission. The latter figure shows an increase of 204 over the corresponding number for the previous year.

A limited follow-up study was made of further records in Stanford of junior college graduates. The scholarship records of students as analyzed by Dr. Eells in 1928 were followed for an additional year and the first-year of record of those entering in 1927–28 was added to his data. The result showed a reduction in scholarship level from 1.62 for the earlier group to 1.56 for the entire group. The latter figure is still slightly, although not significantly, higher than the upper division scholarship average of the control "Native Stanford" group. New students from junior colleges entering in 1928–29 show an improvement in record, a grade-point average of 1.496 as compared with corresponding averages of 1.426 in 1927–28 and 1.473 in 1926–27. This suggests that the slump in the year following Dr. Eells' study was of a temporary nature and that the next similar summary will show a return approximately to the previous level of superiority.

The table of survival of students entering with first-year standing has been advanced another year. The high level of survival reached by the 1925–26 group, but not maintained by those entering the following year, was repeated by the new students of 1927–28.

For the facilitation of research a set of summarized records to parallel the more detailed but unwieldy official record cards of all students has been prepared. These will make available more readily than was previously the case data on other than the routine statistics of enrollment.

Minor investigations during the year, partly published in the *Faculty Bulletin*, have included comparisons of previous scholarship, aptitude test scores, and Stanford scholarship of new students, distributions of the scholarship records of the graduating class of the previous year, grade distributions of faculty members by departments and schools, geographical sources of Stanford students since the opening of the university, reports of Ph. D. holders as to certain values and limitations in their training, possibilities for improving the efficiency of the faculty committee ballot system, and a summary for recent years of the numbers of advanced degrees and of the proportion of graduating classes who return for graduate study.

A TEST OF SCIENTIFIC APTITUDE

A new aptitude test is now available for vocational counselors in high schools and colleges. This is the Stanford Scientific Aptitude Test prepared by Dr. D. L. Zyve. It is a revision of the test described by the author in the November 1927 issue of the *Journal of Educational Psychology*. To quote from the Explanatory Booklet prepared for distribution with the Test, it is "a medium devised for the detection of a particular conglomerate of basic traits which enter into what may be called aptitude for science or engineering. All engineers, and all those whose major interest lies in the field of science, ought to receive (and provision for this is a growing tendency in our college and engineering school instruction) a satisfactory minimum of scientific training. Obviously, this minimum cannot be secured unless the individual has a corresponding minimum of aptitude for science.

"Aptitude, rather than specific ability, has been stressed, for 'capacities' or 'aptitudes' are inherent traits, but loosely dependent upon experience and achievement, whereas the abilities of an individual are ordinarily determined by his experience and achievement. For this reason, the test is not based upon information beyond the scope of the elementary school.

"Among the fundamental capacities determined are: experimental bent, ability to suspend and verify judgment, ability to reason in unfamiliar situations, ability to detect inconsistencies and fallacies, ability to form correct inductions and deductions and to form lawful generalizations, caution, thoroughness, and accuracy of observation and interpretation."

AMERICAN COUNCIL ON EDUCATION

A report of the third Conference on Coöperative Experiments in Personnel Methods under the auspices of the American Council on Education Committee on Personnel methods, held in Princeton, last Spring, is now available.

There were present: H. E. Hawkes, Columbia University (Chairman); Mrs. Mary H. S. Hayes, New York City; Miss A. B. Leahy, Personnel Research Federation; Miss Grace E. Manson, University of Michigan; Miss Dorothy Stimson, Goucher College; F. F. Bradshaw, University of North Carolina; J. J. Coss, Columbia University; A. B. Crawford, Yale University; C. E. Hewitt, American Council on Education; L. B. Hopkins, Wabash College; D. T. Howard, Northwestern University; C. R. Mann, American Council on Education; D. G. Paterson, University of Minnesota; D. A. Robertson, American Council on Education (Secretary); A. H. Ruggles, Providence, R. I.; E. K. Strong, Jr., Stanford University; M. R. Trabue, University of North Carolina; Arthur L. Williston, American Council on Education; Ben D. Wood, Columbia University; C. S. Yoakum, University of Michigan.

Two morning sessions were devoted to a joint meeting of all committees with reports from each; and one afternoon was given to sessions of the several committees.

Committee I, Personal Record Card, reported through Ben D. Wood. The committee proposes to publish a revised manual for the guidance of those who desire to use the personal record card effectively, the revised manual to contain approximately the following material:

I. Philosophy of Cumulative Records and of Continuing Study of Individual Student

II. The Cumulative Educational Record in College
  1. Who should use it
  2. How is it used
  3. Specific cases
  4. Guiding principle—adequate comparable information conveniently available at the right time and place
  5. Relation of guidance to prescribed curricula
  6. Early guidance conditioned by the need for mobilizing emotionalized attitudes around ambitions that have been found feasible for the individual

III. How to Install and Administer the American Council Cumulative Record
    1. Must be installed and recording supervised by an expert
    2. Procedure for person installing record
    3. Recording

Committee II, Achievement Tests, reported through its chairman, H. E. Hawkes. The chairman emphasized the importance of achievement tests to colleges, especially in placement of students after admission. He reported the experience of Columbia College in the autumn of 1928 when it was found that 46.8 per cent of the freshman class had greater competency in subjects than their credentials led the college to suppose they had. He reported also that these students exempted from certain requirements on this basis had completed subsequent work with such distinction as the college had a right to expect. The chairman then reported: Its solid geometry test had not yet been standardized; the preparation of Form B tests was well advanced; an English test had not yet been received from the University of Wisconsin; a Zoölogy test had not yet been received from Columbia; an annotated list of achievement tests was being prepared by Professor Clifford Woody of the University of Michigan. The Secretary of the Committee reported that the first edition of all the American Council on Education achievement tests had been exhausted.

Committee III, Personality Measure ment, reported through its chairman, D. A. Robertson, that it had held a preliminary meeting of Miss Manson and Mr. Bradshaw and the chairman in Washington, and a two-day session in Cleveland at the time of the joint meetings of the personnel associations, and that the committee had been in session May 8 in Princeton. The number of Personality sheets distributed and the institutions using them were reported.

Studies of the rating scale and the description of personality had convinced the committee of the need of further study of what was proving to be a useful form. Miss Dvorak's study of the ratings of University of Minnesota graduate students in psychology was reported. Dean Bradshaw's experiment at the University of North Carolina with different arrangements of the rating scale was also reported, as well as studies at Stanford University by Professor E. K. Strong. Dr. Strong reported on recent experience with the vocational interest test, of which 46,000 have been distributed, stating that 18 scales have been prepared and that at present the test seemed most useful in directing the student's attention to groups of occupations rather than to individual occupations. Permanency of occupational interest was being studied in the records of Stanford graduates who had taken the test. In this Dr. Strong thus far had results somewhat different from those of Professor H. D. Kitson of Columbia.

Committee IV, Vocational Monographs, reported through its Chairman, C. R. Mann. All the experimental monographs reported at the previous meeting (Medicine, Librarianship, Investment Banking, Telephone Service) had been completed and were ready for criticism. The questions which authors desired to have answered were in hand and ready to submit to some twenty colleges for criticism. In addition, the University of Minnesota (Dean Haggerty) has undertaken to prepare a monograph on teaching, the Y.M.C.A. one on the Y.M.C.A. secretary, and New York printers have requested preparation of one on a new phase of printing of interest to college men. Completion and publication of a bibliography on vocational information was reported. Dr. Mann reported also the practical consolidation of the work of this committee with the work of the Council pertaining to records of usage in professions, business and industry.

Committee V, Personal Development, reported through its Chairman, A. H. Ruggles. A bibliography of books and articles in the field has been prepared and fully annotated by Grace Manson of the University of Michigan and after some revision by the committee would be printed promptly. A study of some seventy-five colleges selected for the purpose of securing a cross section of the entire country was in progress, some forty-five replies having been received.

The Director of the American Council on

Education then reported the action of the Cleveland Conference of associations interested in personnel methods inviting the American Council on Education to act as center of coöperation and especially to develop a 1930 conference of interested parties. This was referred to the Central Committee.

The Director also reported the proposal to develop a central bureau for the production and administration and study of achievement tests. This also was referred to the Central Committee.

Committee I, Personal Record Cards, reported that the first of three parts of the proposed manual for the guidance of users of the personal record card had been prepared and would be issued in an edition of 100 for criticism. The chairman further reported recommendation of the committee that the personal record card be prepared in any form useful to an individual college on any useful paper stock and either as a folder or as two separate cards or in any other form. Committee III was requested to provide illustrations of the best usage in regard to personality measurements.

The report of Committee I was adopted.

Committee II, Achievement Tests, reported that it would continue the preparation of an annotated list of achievement tests under the auspices of the Association of College Teachers of Education and the present committee by Professor Clifford Woody. The Committee recognized that the preparation of an adequate English test would take a long time and was prepared to bring about completion of such a test. The Committee was of the opinion that having practically completed the work planned its most important service during the coming year would be the undertaking to bring about coöperation among all parties interested in achievement tests by calling a conference of representatives and possibly by fostering the establishment of a central testing bureau.

The report of the Committee was adopted.

Committee III, Personality Measurement, reported a desire to improve the personality measurement sheet by rearrangement in accordance with the results of experimentation but without changing the items of the rating scale; to hold a meeting of the committee for the consideration of further evidence to be developed; to experiment with devices for measuring temperament, and especially a speed test to be developed at the University of Minnesota under the direction of Professor D. G. Paterson; to frame a useful fellowship application form; to urge creation of a Bureau of Tests and Testing; to coöperate with Committee V in developing instruments useful in character development.

The report was adopted.

Committee IV, Vocational Monographs, reported that it desired the coöperation of the following institutions in criticism of the published vocational monographs:

Albion College, College of the City of Detroit, Harvard University, Iowa State College, Kalamazoo College, Northwestern University, Oberlin College, Ohio State University, Pennsylvania State College, Purdue University, Radcliffe College, Smith College, Stanford University, Syracuse University, University of Buffalo, University of Chicago, University of Minnesota, University of North Carolina, University of Pittsburgh, Vassar College, Wellesley College, Yale University.

The Committee reported also its intention to complete a manual on the vocational monograph. The Committee was prepared to coöperate in the preparation of monographs for the following fields: Outlets for Students of Government; Insurance; Engineering; Retail Stores; National Electric Light Association; Electrical Manufacturing (Western Electric, General Electric, Westinghouse, etc.). The Committee further recommended amalgamation of the work of this committee in assembling vocational information with that work of the American Council on Education concerned with records of usage in professions and industry, and the addition of the two members of the Council's staff concerned with records of performance, job specifications and records of usage to Committee IV which should be re-named Committee on Occupational Information.

The report was approved and referred to the Central Committee.

Committee V, Personal Development,

reported its program to include publication of the bibliography prepared by Miss Manson including an introduction explaining the purpose of the committee; to study the activities of some ten colleges by sending representatives of the committee to each of these institutions.

BRITISH RESEARCH BOARD CHANGES TITLE

The ninth annual report on work undertaken and in progress by the former Industrial Fatigue Research Board has been published under the recently adopted title of the organization: The Industrial Health Research Board. At the time of its formation the Board was concerned mainly with an attack on the problem of the almost universal industrial fatigue brought on by the long working day of war-time. As this problem of over-time began to be automatically corrected the functions of the Board extended into other fields and problems rather remote from fatigue. It has been for sometime past and is now the avowed purpose of the Board to concern itself with industrial health problems, which will be interpreted to include everything that concerns the worker's fitness and comfort within the sphere of his work. Responsibility for investigations requested by Government Departments into occupational diseases will be assumed in future by the Board. The investigations and researches listed in the ninth annual report indicate the scope of the work and the suitability of the title "Industrial Health Research Board:"

- Particular Problems of wide Industrial Importance:
  - Hours of Work, etc.
  - Physiology of Ventilation
  - Vision and Lighting
  - Noise and Vibration
  - Accident Causation
  - Absenteeism due to Sickness
  - Standardisation of Sickness Records
  - Effects of Menstruation
  - Incidence of Nervousness
  - Physique of Men in Industry
  - Labour Turnover
  - Repetitive Work
  - The Rate of Improvement in Industrial Occupations
  - Vocational Guidance
  - Vocational Selection
  - Other Investigations
- Specific Problems submitted by Government Departments and Industrial Associations:
  - Sickness among Printers
  - Sickness among Cardroom Operatives
  - Sickness among Miners
  - Causes of Absenteeism among Miners
  - Air Humidity in Mines
  - Load Carrying by Men
  - Vocational Selection for Government Departments
- Laboratory Researches:
  - Principles governing Muscular Activity
  - Industrial Work involving Muscular Effort
  - Transfer of Acquired Skill
  - The Relation of Age to the Acquisition of Dexterity
  - Psycho-galvanic Reflex

PSYCHOLOGY INSTITUTE INCORPORATED

The first step toward the establishment of a national research center for the study of human and animal psychology was taken by a group of experimental psychologists in the recent incorporation of the National Institute of Psychology. Pioneers in this movement for a national psychological laboratory similar in some functions to the Bureau of Standards are Knight Dunlap, Johns Hopkins University, Dr. Hugh G. Cumming, Surgeon General of the United States Public Health Service, and the late Edwin E. Slosson. The institute has at present an active membership of fifty of the leading experimental psychologists in America recruited from twenty universities. In addition to studies at the proposed centrally located institute many projects will be carried on in university laboratories and in this way coöperation in both methods and results will be attained.

A STUDY OF PACKING

A study of the supplies used and the methods employed in folding, packing and wrapping merchandise for delivery to the customer is being sponsored by the National Retail Dry Goods Association, which will have the coöperation of the Department of Commerce in the work. A preliminary survey, already under way in New York and Boston, will lay the foundation and chart the course for the project on a nation-wide scale.

The study is being made with a view to introducing economies by way of improved methods. A saving of 10 per cent in the present cost of packing and wrapping merchandise would result, it is estimated, in a cost reduction of over $9,000,000 a year.

INTERNATIONAL LABOR RELATIONS

Realizing the necessity and importance of international liaison in this age of narrowing oceans, Industrial Relations Counselors has appointed a second American representative to the International Labor Office. Dr. Boyce Stewart, appointee, will join Thomas G. Spates in Geneva next year. In announcing this Arthur H. Young, director, declared that we of the United States had much to learn from Europe concerning labor relations. While our individual industrialists have made great and intelligent strides of their own volition, governments across the waters have surpassed our own in concreted labor legislation and control.

AMERICAN MANAGEMENT ASSOCIATION

The establishment of a Personnel Division has recently been announced by the American Management Association. C. R. Dooley, Personnel Manager of the Standard Oil Company of New York has been elected Vice President in charge of this new division which has been formed to provide for the discussion of personnel techniques including recruiting, testing and training of new employees, employee service activities, benefit systems, health activities and fatigue control. Each of the other divisions of the Association will continue to give consideration to the specific personnel problems of its field. Personnel problems of general interest such as the discovery and development of executive talent, pension policies and similar topics will continue to be discussed at the general management meetings of the Association. In fact "Personnel" is announced as the principal subject of the Winter Conference to be held in Chicago during the first or second week in February.

NATIONAL RESEARCH COUNCIL FELLOWSHIPS

Announcement of available fellowships in the biological sciences (including psychology) have been made by the special board of the National Research Council responsible for their administration. These fellowships supported by the Rockefeller Foundation are open to men and women citizens of the United States and Canada who have the Ph.D. degree or its equivalent. Their purpose is the promotion of fundamental research through the development of thoroughly trained investigators. Fellows for 1930–31 will be chosen at two meetings of the Board. Applications must be filed before January first or April first to insure consideration at the following meeting. Forms to be used by candidates and complete information may be secured by addressing the Chairman, Board of National Research Fellowships in the Biological Sciences, National Research Council, Washington, D. C.

Book Reviews

NORTHWESTERN GIVES FACTS

Student Personnel Work at Northwestern University. By Esther McD. Lloyd-Jones, New York: Harper and Brothers, 1929. 253 pp.

Reviewed by Karl M. Cowdery

From the many opinions that are being expressed in popular magazines and in the proceedings of the conferences of university officers and teachers one might gather the impression that our colleges and universities are too small and too large; the courses are too academic, too practical, too cultural or entirely lacking in culture; students are well fitted or are wholly unfit to attend; the instruction is very poor or it is excellent; the problems of individual students are sadly neglected or are being well met. Both extremes and all degrees between seem to have been inspected and reported. Probably all are true somewhere. However, sweeping conclusions drawn from hastily observed local data and applied to higher education as a whole can be of little value to the practical administrator faced with conditions as they are in his particular circle of influence.

It is refreshing by contrast to have a definite and authoritative report such as this in which Mrs. Lloyd-Jones describes a university personnel organization and program that is constructive and apparently relatively successful in scientifically obtaining facts to pave the way for administrative policy. Service is also rendered in the selection and devising of methods for executing the policies when authorized. The organization and program described are frankly local in nature, defensible as such, and are to be juged as to merit by the results obtained. The presentation is valuable in collecting under one cover a nearly complete story with sufficient detail to serve as a manual or at least guide to other institutions in working on similar problems provided the similarity of the situation can be determined. For colleges differing in organization, functions and equipment, the book provides much that is useful if properly adapted, for instance, to noncentralized personnel activity. The forms, programs, and questionnaire blanks reproduced in the appendices together with the various tabulations and charts in the text will be found helpful in working out detailed procedures.

Being well written, conveniently arranged to cover separately the organization, service activities, and research functions, and having well placed paragraph annotations the volume lends itself not only to unified reading but also to use as a reference book. The lack of bibliographic lists detracts from its possibilities as a text in courses dealing with personnel administration or research. Particularly disappointing is the sparseness of comparisons or even references to studies in other institutions dealing with the same subjects as are discussed in the two chapters outlining research problems and results obtained at Northwestern. The inclusion of supplementary reading and reference lists in the research sections as full as that in the chapter on Mental Hygiene would certainly have more than doubled the value to the reader interested in either the administrative or research phases. Interest is frequently sustained by case studies to illustrate otherwise brief mention of vital problems.

To the institution which does not have a so-called Personnel Department but which can identify the various activities described and find them being successfully and smoothly carried on in its midst the book will bring the satisfaction of knowing that its students are being well cared for and the faculty are carrying out their true functions of service without the need of special coördination and artificial consciously stimulated effort. But in any college or university, and especially the larger ones, is there the place for self-evaluation by scientific methods. The dual phases of the problem, *i.e.*, institutional group efficiency and attention to the individual problems of students, are well illustrated. Valuable techniques and suggestions of projects for continuous self-survey are included in the reports of researches both begun and completed.

A companion volume describing scientifically measured results—before and after personnel work was organized—might help to answer some of the critics of particular techniques such as selection based on combined scholarship and intelligence test ratings, freshman week programs, sectioning on ability, etc.

Mrs. Lloyd-Jones has made a timely contribution to the literature of educational practice by thus describing the crystallization into organization and activity of some of the basic functions and obligations of educational institutions.

ORGANIZATION PROBLEMS IN ENGLAND AND AMERICA

Factory Organization. By Northcott, Sheldon, Wardropper and Urwick. New York: Isaac Pitman & Sons, 1928. 252 pp.

Industrial Organization and Management. By W. B. Cornell. New York: Ronald Press, 1928. 653 pp.

Reviewed by Ordway Tead

These two books illustrate in an interesting way the contrast between the English and American approach to organization study. This is not necessarily a criticism of either although it would seem that a balanced combination of the two would yield the most significant results. The English studies with which the writings of John Lee, Sheldon and Northcott have made us familiar are preoccupied with the theory of management organization but in an applied way and with an eye to practical consequences. While American studies have thus far been for the most part long on managerial method and procedure but short on basic theory, the notable exception of course was Taylor's work setting forth his theories about functionalization which have been followed in whole or part by practically all subsequent writers both here and abroad.

In the present English volume the relative emphasis on theoretical analysis and practical methods is typical. Mr. Sheldon's chapter on the Organization of Business Control is an excellent piece of analysis, representing one of the best brief summaries of the subject available. Mr. Northcott's chapter in Industrial Relations emphasizes the reasons for personnel work and its ethical implications in a way rarely dwelt upon in American books, yet essential to a complete view of the subject. Altogether the volume has real merit for an American managerial audience because of its special emphasis and point of view.

Professor Cornell's text covers the ground more typically examined in American studies, while stressing the managerial aspects of all problems treated. Its range is thorough; its grasp strong and clear; its balancing of mechanical and human aspects of problems judicious. From it the student will get an admirable picture of the functions required in operating industrial plants. And the forms and schedules reproduced are helpful in their inclusiveness and suggestive value. If when he has digested this study in methodology the student would supplement it by a reading of the English volumes like the one above, his orientation would be firmly based and sound.

"THE WORKER IS NO MACHINE"

The Human Factor in Industry. By E. P. Cathcart. Oxford University Press, London: Humphry Milford, 1928. 125 pp.

Reviewed by Yandell Henderson

In the development of modern industry the use of the steam engine was the first stage. It is now complete, for no engineer expects any further great improvements. The second stage was the introduction of electricity. This development also, altho not yet complete, is probably nearing the limit of possible exploitation. The third stage is now at hand. It is the better utilization and conservation of "the human factor in industry." And it is with this topic that the interesting and suggestive lectures of Professor Cathcart printed in this book have to do.

The first lecture deals with the physiology, including the psychology, of man in modern factory industry. Professor Cathcart gently but effectively cuts the ground from under many so-called "psychological" investigations based upon the use of questionnaires, by the remark: "It is well-nigh impossible by straight questioning to discover the real motives or causes of any man's particular line of action."

The second lecture on "fatigue and monotony" admits that "it is questionable, with the means at present at our command, if it will ever be possible to measure fatigue." Yet several valuable suggestions for the avoidance of fatigue are offered, such as the decrease of "static work" and the cultivation of natural rhythm.

The third lecture dealing with the "alleviation of fatigue" presents some investigations to this end. Among the "environmental factors" stressed in the fourth lecture are factory ventilation, lighting and the designing of machines suitable for use by "the human being who is responsible for working the machine."

In the fifth lecture on "industrial personnel" the importance and the difficulties of vocational selection are considered. Women are shown to be well adapted to some industries, such as weaving, but to be handicapped by their lesser physical strength in others. For all men and women in industry Professor Cathcart emphasizes the view: "The worker is no machine skilled or otherwise. He is a human being and, like all other human beings, he does his best work when he is comfortable, healthy, and happy."

A brief appendix on "the living wage," adequate housing, food, clothing, and recreation, together with a bibliography and index complete this very readable little book.

A USEFUL PHYSIOLOGY

The Study of Conditioned Reflexes as a Foundation for Pedagogy. By G. P. Frolov (University of Moscow). Moscow: Rabotnik Prosveschenia, 1928. 309 pp.

Reviewed by D. L. Zyve

The book written by Professor Frolov, one of Pavlov's distinguished pupils, does not pretend to offer a well rounded physiological interpretation of educational theory. But like Pavlov, himself, the author would like to see psychology replaced by physiology in the field of education. According to Frolov, any educational theory, if it deserves this name, ought to be built "upon the solid foundation of anthropology," which includes morphological and functional anthropology and, therefore, physiology.

"Inasmuch as all human behavior consists of a number of adaptive reflexes, or reactions, of varying complexity, the development of the child takes place, thanks to the gradual accumulation of these reactions. . . . In spite of the intensity and the importance of inherited reflexes, it is the acquired, or conditioned reflex, whether positive or inhibiting, that plays the most important rôle in the development of the child, from the pedagogical point of view."

The establishment of the existence of inhibition reflexes, which take place during the extinction of a conditioned reflex, has made it possible to study phenomena of inhibition which occur during the exploration of the outside world, by an animal, or a human. It is upon "the balance of cerebral excitation and inhibition" that new pedagogy will be built.

The book is divided into four chapters. The first outlines the historical development of pedagogy and its relation to psychology and the natural sciences. The second chapter deals with the evolution of the higher nervous activity in man and animal; the formation of conditioned reflexes in children; extero-, intero-, and proprioceptive reflexes; the formation of reflexes of higher order; "functional" anthropology and its relation to educational physiology. The third chapter studies the inhibition of conditioned reflexes in its relation to pedagogy. The last chapter examines various types of higher nervous activity from the angle of conditioned reflexes. It also offers an interesting analysis of "individuality," and concludes with an attempt at grounding all education upon the physiology of conditioned reflexes.

To whatever extent the author may have succeeded in this latter task, his attempt is decidedly significant, and it would be highly desirable to have his book translated into English.

NEW WAGE POSSIBILITIES

The New Industrial Revolution and Wages. By W. Jett Lauck. New York: Funk & Wagnalls, 1929. 308 pp.

Reviewed by Ordway Tead

Mr. Lauck in his latest book is examining how the war and post war wage experience is gradually shifting the emphasis of employers and organized workers alike from supply and demand factors to productivity factors. Perhaps no consultant has been a closer observer and more direct participant in this process; and the record of transition is impressive. Despite the fact that the actual wages of the unskilled are still much too low, Mr. Lauck marks what improvements there have been and suggests further ways out. There is a sanity and realism in his constructive thinking which have had a sure appeal to the more informed groups whom Mr. Lauck has been able directly to influence. His idealism is based on fact knowledge and he knows where he wants to go. Yet his very insistence on collective bargaining with labor unions, unquestionably weakens the rest of his message for many who have still to see the light on this point although willing to go far on improved payment plans alone. This is a useful book, particularly in its latter half; and its general position that wages must relate more closely to improved productivity is, fortunately, growing in favor among many business men who would not yet subscribe to Mr. Lauck's full "code."

The author's forthright and unyielding manner of statement of his proposals seems to me to lack seriously in persuasiveness. The take-it-or-leave-it attitude obtrudes. It seems a pity that a scholar of Mr. Lauck's grasp could not address himself more patiently and educationally to the unregenerate many: For the regenerate few he has supplied an analysis and a program to which they can readily assent.

MANAGERIAL PROFIT SHARING

By C. C. Balderson. New York: John Wiley & Sons, 1928. 257 pp.

REVIEWED BY ORDWAY TEAD

Professor Balderson has supplied a much needed examination of the present status of plans for sharing profits with executives. That such efforts are on the increase and gaining in favor has been realized for the last few years. And everyone interested both in the theory and practice of such profit sharing will need to have this volume.

A most interesting conclusion on the more general side is the following: "One of the most pleasing effects of the profit-sharing arrangement is the lubricating action which reduces friction in the organization and places the emphasis on coöperative effort rather than on the petty desires of individual self-interest. Not only does it aid in overcoming some of the natural inertia which opposes new steps or policies, but it awakens a unity of purpose that smooths the way for many decisions which otherwise would be difficult to effect. The business machine tends to run with less friction and more speed."

BRIEFER MENTION

Analysis of the Single Color Offset Pressman's Trade. New York: Lithographic Technical Foundation, Inc., 1928. 135 pp.

This job analysis of the single color offset pressman's trade is made in the interest of a course of study from which textbooks may be written for apprentices. After a general survey of the varying conditions under which this trade operates detailed activity analyses were made under four headings, "getting ready to run the trial impression," "getting the lay," "tending the press during the run," and "activities not included in the preceding." These activity analyses were then submitted to foundation subscribers and to pressroom foremen for checking and suggestions. Where there was a high degree of agreement in the comments the analyses were regarded as correct.

In order to form the material into a course of study a further investigation was undertaken in which six pressmen rated each operation on a five-point scale (easy to learn, fairly easy, medium, fairly hard, and hard to learn). A further analysis was made to determine for each operation the (1) facts of a purely denominative character, (2) facts of a purely how-to-do character, (3) facts of a purely "why" character, and skills. Based upon this investigation a two year course of study for apprentices was prepared.

Music in Industry. Kenneth S. Clark. New York: National Bureau for Advancement of Music, 1929. 383 pp.

The musical survey of industry, of which this volume is a report, shows that 679 industrial and commercial establishments in this country maintain some form of musical organization. There are 267 bands, 182 orchestras, and 176 choruses reported. One hundred and thirty-three plants maintain community singing and two hundred and seventy-three plants provide musical instruments for their employees. Bands are more popular among the railroad industries and choral activities in department stores. In the upkeep of these activities the employers assume the cost in one hundred and six establishments and in seventy-eight others the cost is evenly divided between firm and workers.

Check Lists for Educational Research. Harold Hench Bixler. New York: Bureau of Publications, Teachers College, 1928. 98 pp.

This author has attempted an activity analysis of an educational research problem. The list of activities resulting from this analysis will serve as a reminder to any research worker of the many phases of the procedure. Before beginning the research there are 50 items to receive attention. If the research is a quantitative one, there are 211 activities needing attention. Sixty-nine items of statistical procedure are listed. A list of 157 activities relate to the form of presentation and especially to the English composition.

Ten Years of Educational Research 1918–1927. Walter S. Monroe. Urbana, Ill.: University of Illinois Press, 1928. 366 pp.

Various types of publication called educational research during the pioneer period previous to 1918 are referred to in this book. There is a general survey of the growth of scientific method in education during 1918–1927, which is followed by a discussion of the development of the methods of educational measurement and curriculum research. Part II presents a bibliography of 3650 titles upon various phases of educational research from 1918–1927. An indexing method for keeping track of such publications and a list of doctors of philosophy in education by institutions during this period are included.

Educational Psychology, An Introductory Text. Rudolf Pintner. New York: Holt, 1929. 378 pp.

This book departs from the usual order of topics of general psychology, omits the study of the nervous system, and includes as a large part of the general treatment the measurement and adjustment problems of education. The body of the text is organized under the main topics of original nature and the modification of original nature, in which mental measurement is the important factor of the first part and learning the important factor of the second part.

Health Education Tests. Raymond Franzen. New York: American Child Health Association, 1929. 70 pp.

This first monograph of a series contemplated by the American Child Health Association, describes the inauguration of the scientific program and the formulation and standardization of the first group of five tests. It is intended as a contribution toward the definition of health goals, supervision of health programs, the discovery of the needs of individuals for health education and training and the development and improvement of research. The tests are described and the statistical tables of standardization are fully shown.

The Comparative Coachability of Certain Types of Intelligence Tests. Hsuan Shan Chen. New York: Bureau of Publications, Teachers College, 1928. 100 pp.

The author of this research reviews the specialized literature on the coachability of certain intelligence tests and describes an experiment which he conducted, using the Rapid Survey Test and the CAVD Test upon 300 fifth and sixth grade children. In the treatment of the results several methods of measuring "gain" are compared, such as "the method of gross scores," "the percentage of initial scores," "the percentage of possible gain," "the method of corrected scores," "the variability score," and "the significance of gain method." A modified T-scale, based upon steps of one-tenth of a standard deviation in the test scores of 346 fifth and sixth grade children, was prepared to show the variable gains after coaching.

Training for Group Experience. Alfred Dwight Sheffield. New York: The Inquiry, 1929. 105 pp.

This is an abstract discussion of the philosophy of group meetings. The discussion group is regarded as an exceptional medium for the leader to present his cause. His effectiveness is said to be measured by the stimulation to thought and discussion by the individual members of the group.

Creative Discussion (2d ed.). Alfred Dwight Sheffield. New York: The Inquiry, 1927. 58 pp.

This is a statement of method for leaders and members of educational discussion groups. Emphasis is given to the need for a study of the whole situation in which a problem lies, not merely the subject as formulated in a phrase or sentence. The leader should expect to act as pilot. Not that he will steer it to his liking. His part is rather to keep the group aware of rocks, shallows, and aimless circling. Leaders are advised not to take sides, not to talk too much, not to let the conference be monopolized and not to be frightened by prejudice. On the contrary, they are advised to be concrete and definite, to look upon the group as a clinic for the study of "mind-sets," and to see that the discussion follows orderly lines toward some objective.

The Economic Effects of Education as Shown by Statements of Economists. Harold Florian Clark. Bloomington, Ind.: Indiana University School of Education, 1928. 39 pp.

By this pamphlet the author desires to stimulate more careful thinking upon the economic effects of formal schooling. He quotes from various writers of economic theory, who refer to this problem. There seems to the author to be no satisfactory description of present schooling methods from the economic point of view and he hopes to remedy this defect in the near future.

The Anatomy of Emotion. E. W. Lazell. New York: Century Co., 1929. 267 pp.

Emotion is defined as "an energizing state of consciousness which arises from bodily changes and in turn always finds expression in certain bodily movements and attitudes." All emotions, no matter how complicated, are founded upon fear or love. Fear, as a destructive emotion, is found in self-pity, wanderlust, and sensitiveness. The constructive emotions, such as getting on with others and success have their basis in love. "Human consciousness is directly under the control of the emotions. Time and space are the movements in consciousness by which it may be interpreted." The sense of space is expanded by love. Fear expands the sense of time. The degree of responsibility of man to himself, his fellow-men, and to God is dependent upon the development of consciousness—hence, the importance of a wholesome form of self-analysis which the author recommends.

New Books

PERSONNEL MANAGEMENT

Conyngton, Mary. *Public service retirement systems, United States, Canada and Europe.* Washington, D. C.: Government Printing Office, 1929. 230 p. Apply.

Dobb, Maurice Herbert. *Wages.* New York: Harcourt, Brace & Company, 1929. 178 p. $1.25.

Taylor, Paul S. *Mexican labor in the United States.* Berkeley, California: University of California Press, 1929. 18 p. Paper 25¢.

Judy, Helen Elizabeth. *Trends and needs in home management.* New York: Teachers College, Columbia University. 136 p. $1.50.

Leuck, Miriam Simons. *Fields of work for women.* New York: D. Appleton & Company, 1929. 366 p. $2.50.

VOCATIONAL INFORMATION

Broderick, John Thomas. *Forty years with General Electric.* Albany, New York: Fort Orange Press, 1929. 218 p. $2.50.

Case, H. C. M. and Others. *Organizing the corn-belt farms for profitable production.* Urbana, Illinois: University of Illinois, 1929. 73 p. Apply.

Parsonnet, Aaron E. and Hyman, Albert S. *Applied electrocardiography.* New York: Macmillan Company, 1929. 231 p. $4.00.

Stanton, Sanford E. *Theatre management.* New York: D. Appleton & Company, 1929. 160 p. $1.50.

Smith, Lewis Worthington and Blough, Gideon L. *Planning a career.* New York: American Book Company, 1929. 480 p. $1.44.

Truax, T. R. *The gluing of wood.* Washington, D. C.: Government Printing Office, 1929. 78 p. Paper 25¢.

Viscose Company. *The story of rayon.* New York: Author. 1929. 63 p. Apply.

Wisconsin Vocational Pamphlets. *Machine shop unit.* New York: McGraw-Hill Book Company, 1929. Paper 35¢ each, per dozen $4.00.

EDUCATION

Branegan, Gladys Alee. *Home economics teacher training.* New York: Teachers College, Columbia University. 267 p. $1.75.

Clufton, John Leroy. *The small secondary school in Ohio.* Columbus, Ohio: R. G. Adams & Company, 1929. Apply.

Cocks, A. W. *The pedagogical value of the true-false examination.* Baltimore: Warwick & York, 1929. 141 p. Apply.

Cubberley, Ellwood Patterson. *Public school administration.* Boston: Houghton Mifflin Company. 732 p. $3.25.

Furfey, Paul Hanly. *A selected bibliography on child development.* Washington, D. C.: Catholic Education Press. 51 p. Paper 35¢.

Hicks, Kate E. and others. *Some teaching essentials.* Athens, Georgia: McGregor Company. 1929. 130 p. Paper. Apply.

Mearns, Hughes. *Creative power.* Garden City, New York: Doubleday, Doran & Company. 404 p. $3.50.

Moore, Clyde B. *Citizenship through education.* New York: American Book Company. 335 p. $1.40.

Mossman, Lois Coffey. *Principles of teaching and learning in the elementary school.* Boston: Houghton Mifflin Company. 1929. 307 p. $1.90.

Nolan, Aretas Wilbur. *Techniques used in dealing with certain problems of college teaching.* Urbana, Illinois: 25 p. Apply.

Price, Olive M. *The gateway of tomorrow.* St. Paul, Minnesota: Scott-Mitchell Publishing Company. 48 p. Paper 50¢.

Reeder, Edwin Hewett. *Simplifying teaching.* Chicago: Laidlaw Brothers. 1929. 192 p. $1.76.

Schmidt, C. C. *Teaching and learning the common branches.* New York: D. Appleton & Company, 1929. 418 p. $2.25.

Schweickhard, Dean M. *Industrial arts in education.* Peoria, Illinois: Manual Arts Press, 1929. 376 p. $3.00.

True, Alfred Charles. *A histry of agricultural education in the United States.* Washington, D. C.: Government Printing Office, 1929. 455 p. $1.00.

Walker, Helen Mary. *Studies in the history of statistical method.* Baltimore: Williams & Wilkins. 237 p. $5.00.

Wood, Ben D. and Freeman, Frank Nugent. *Motion pictures in the classroom.* Boston: Houghton Mifflin Company, 1929. 413 p. $1.80.

PSYCHOLOGY

Adams, Sir John. *Everyman's psychology.* Garden City, New York: Doubleday Doran & Company, 1929. 446 p. $2.50.

Behrend, Genevieve. *Attaining your desires, by letting your sub-conscious mind work for you.* Holyoke, Massachusetts: Elizabeth Towne Company, 1929. 155 p. Fabric $1.60.

Bernfeld, Dr. Siegfried. *The psychology of the infant.* New York: Brentano's, 1929. 320 p. $4.00.

Kuntz, Albert. *The autonomic nervous system.* Philadelphia: Lea & Febiger, 1929. 576 p. $7.00.

Lorimer, Frank. *The growth of reason.* New York: Harcourt, Brace & Company, 1929. 243 p. $3.75.

Manuel, Herschel Thurman. *Master of my fate.* New York: Century Company, 1929. 341 p. $3.00.

M'Graw, Sister Mary Louise, and Mangold, Sister Marie Cecilia. *Group intelligence tests in the primary grades.* Washington, D. C.: Catholic Educational Press, 1929. 41 p. Apply.

Pitkin, Walter Boughton. *The psychology of happiness.* New York: Simon and Schuster, 1929. 419 p. $3.00.

Rexroad, Carl Newton. *General psychology for college students.* New York: Macmillan Company, 1929. 407 p. $2.10.

Thomas, Dorothy Swaine, and others. *Some new techniques for studying social behavior.* New York: Teachers College, Columbia University, 1929. 213 p. $2.00.

Watson, John Broadus. *Psychology from the standpoint of a behaviorist.* Philadelphia: J. B. Lippincott Company, 1929. 475 p. $3.00.

Wexberg, Erwin, M.D. *Individual psychology.* New York: Cosmopolitan Book Company. 436 p. $4.00.

Wehner, George. *A curious life.* New York: Horace Liveright, 1929. 402 p. $2.50.

ECONOMICS

Bradley, John Robins. *Fuel and power in Canada with special reference to the factors affecting American coal.* Washington, D. C.: Government Printing Office, 1929. 20 p. Paper 20¢.

Cornish, Newel Howland. *Coöperative marketing of agricultural products.* New York: D. Appleton & Company, 1929. 501 p. $3.50.

Hobson, John Atkinson. *Economics and ethics.* New York: D. C. Heath & Company, 1929. 520 p. $4.00.

Lippincott, Isaac. *Economic resources and industries of the world.* New York: D. Appleton & Company, 1929. 678 p. $5.00.

National Industrial Conference Board. *Mergers in industry.* New York: Author, 1929. 205 p. $3.00.

Pigou, A. D. *The economics of welfare.* New York: Macmillan Company, 1929. 866 p. $8.00.

The soviet union looks ahead. New York: Horace Liveright, 1929. 287 p. $2.50.

LABOR LEGISLATION

Alexander, Uhiman S. *Special legislation affecting public schools.* New York: Teachers College, Columbia University, 1929. 147 p. $1.50.

Batsell, Walter Russell. *Soviet rule in Russia.* New York: Macmillan Company, 1929. 866 p. $6.00.

Beckner, Earl D. *A history of labor legislation in Illinois.* Chicago: University of Chicago Press, 1929. 553 p. $4.00.

Carroll, Mollie Ray. *Unemployment insurance in Germany.* Washington, D. C.: Brookings Institution, 1929. 147 p. $2.00.

SOCIOLOGY

Linfield, Harry S. *The Jews in the United States.* New York: American Jewish Committee, 1929. 107 p. Apply.

Odum, Howard Washington and Jocher, Katherine. *An introduction to social research.* New York: Henry Holt & Company, 1929. 502 p. $4.00.

Thompson, Warren Simpson. *Danger spots in world population.* New York: A. A. Knopf, 1929. 364 p. $3.50.

Wright, Benjamin Fletcher, Jr. *A source book of American political theory,* 1929. 655 p. $3.75.

HEALTH

Oldfield, Josiah, M.D. *Eat and be happy.* New York: D. Appleton & Company, 1929. 123 p. $1.50.

Sayers, Aroyd Ray. *Effect of repeated daily exposure of several hours to small amounts of automobile exhaust gas.* Washington, D. C.: Government Printing Office, 1929. Paper 15¢.

Wells, Walter A., M.D. *The common head cold and its complications.* New York: Macmillan Company, 1929. 238 p. $2.75.

PHILOSOPHY

Conger, George Perrigo. *New views of evolution.* New York: Macmillan Company, 1929. 244 p. $2.50.

Hocking, William Ernest. *Types of philosophy.* New York: Charles Scribner's Sons, 1929. 477 p. $2.50.

Current Periodicals

Prepared by Linda H. Morley, *Industrial Relations Counselors, Inc.*

AGE

Employment prospects of middle-aged workers. *Service Letter on Industrial Relations,* Oct. 5, 1929, No. 43, 1–3.

The problem of the adjustment of the mature worker to the changing conditions and demands of industry today is not of so recent origin as has been supposed. Twenty years ago a commission appointed by the Massachusetts legislature to study the advisability of enacting an old age pension law, in its report dated 1909, stated, "The universal demand nowadays is for young men. Many concerns refuse to take on inexperienced men over 35 years of age. . . . ."

Until it is known how large a part of

the companies which enforce age restrictions do so from practical necessity, rather than merely as a means of speeding up production, and also whether companies having such restrictions control an appreciable proportion of opportunities for employment, it is doubtful to assume that the policies of certain concerns are representative of the practice of industry as a whole.

The question opens a broad field for constructive thought and action. Our economic system must open to the middle-aged worker alternative employment, or be open to serious challenge.

FISK, EUGENE LYMAN (M.D.; Medical Director, Life Extension Institute, N. Y. C.). Possible extension of the human life cycle. *Annals of the American Academy of Political and Social Science*, Sept. 1929, Vol. 145, 153–201.

A summary of the data and evidence presented in this article may be briefly expressed thus: Mankind is in the infancy of the race; Man can be molded by billions of factors in his heredity and environment; Science has in some degree controlled the germ plasm which is not inviolate; The life cycle of man has not been fixed by any agency, but is controlled by evolution; Age is not a function of time but is a physical state; Time has no influence over the organism; The life cycle that would be dependent upon natural evolution does not signify that of man because man may nullify or augment the effects of natural evolution; The human life cycle has been changed by human society and science; In the life extension field the aim is to improve the quality of human life, the mere extension of life is a by-product.

MYERS, ROBERT J. (Grinnell College). Occupational readjustment of displaced skilled workmen. *Journal of Political Economy*, Aug. 1929, Vol. 37, 473–489.

A study, confined to "cutters" in the Chicago men's clothing industry, selected as a representative group of those workers who were forced out of their trade by the introduction of more machine work than hand work in their trade. This discussion attempts to show what happened to 370 cutters. A table indicates the trades in which these men were engaged after a period of one and one-half years since leaving their trade. Only one-fourth of the men were engaged in any trade similar to cutting and most of the men with temporary jobs worked but a few months of the year in which cases it was difficult to distinguish their positions from unemployment.

STEVENS, ALBERT FREDERICK, JR. (New York University). Accidents of older workers. relation of age to extent of disability. PERSONNEL JOURNAL, Aug. 1929, Vol. 8, 138–145.

Statistical study.

COLLEGE MEN IN BUSINESS

LINCOLN, JONATHAN T. Company training for college graduates. *Harvard Business Review*, July 1929, Vol. 7, 432–443.

Includes a list of companies having training programs.

ETHICS

DONHAM, WALLACE B. Business ethics—a general survey. *Harvard Business Review*, July 1929, Vol. 7, 385–394.

An address delivered at Northwestern University, opening the William A. Vawter Foundation Lectures on Business Ethics.

EXECUTIVES

BATT, WILLIAM L. Duties of a chief executive in a business of moderate size. *Mechanical Engineering*, Sept. 1929, Vol. 51, 682–684. (Abstract in *Management Review*, Oct. 1929, Vol. 18, 332.)

The major functions suggested are, the creation of an effective operating staff, controlling the budget system, the determination of major policies, and the study of the general trend of business. The relative importance of these duties is specified.

FATIGUE

PAGE, RICHARD M. (University of Chicago). On supplanting the industrial fatigue concept. *Society of Industrial Engineers Bulletin*, July 1929, Vol. 11, 3–9.

Reprinted from the *Journal of Business.* Includes a bibliography.

In industrial usage, fatigue is often held to be simply that effect of doing work which results in a lowered capacity for the continuation of such work. All physiological definitions describe certain changes which occur as a result of muscular work, but it is arbitrary to declare that they constitute what we have come to know under the name of fatigue. Human fatigue cannot be handled quantitatively. No fatigue tests so far proposed have been found to give consistent results under all circumstances.

By replacing the fatigue concept with that of energy cost, the author presents a fresh point of view illustrating by graphs the many possible applications of his theory.

Vernon, H. M. Fatigue of heavy industrial work, and its influence on the health and duration of industrial life. *Journal of State Medicine,* March 1929, Vol. 37, 141–152. (Abstract in *Journal of Industrial Hygiene,* September 1929, Vol. 11, 166).

GROUP INSURANCE

Robbins, Rainard B. Group life insurance—what shall the expression include? *Transactions of the Actuarial Society of America,* May 1929, Vol. 30, 32–39.

The phenomenal growth of group life insurance in this country has been in the last decade. Twenty years ago this type of insurance was unknown; ten years ago there was in force 627 million dollars of this business, while today there is in excess of six billion dollars of insurance in force of this type. The author attempts to tabulate some of the characteristics of this coverage and the methods of operation involved which seem to have been responsible for this growth; also to inquire whether or not the elements of success of employer group insurance justifies the extension of the collective insurance method to other groups.

Williamson, W. R. Actuarial note: does group life insurance cost show a tendency to increase with the age of the contract? *Transactions of the Actuarial Society of America,* May 1929, Vol. 30, 167–171.

HEALTH

Kindel, D. J. Medical and public health work in a large coal company. *American Journal of Public Health,* July 1929, Vol. 19, 725–730.

The medical director of the Consolidation Coal Co. outlines their program which provides medical and nursing service for 10,000 employees and their families. Operations extend into 4 states.

Sydenstricker, Edgar. (Statistician, U. S. Public Health Service) Economic status and the incidence of illness: Hagerstown (Md.) morbidity studies number 10, gross and specific illness rates by age and cause among persons classified according to family economic status. *Public Health Reports,* July 26, 1929, Vol. 44, 1821–1833.

INTERNATIONAL INDUSTRIAL RELATIONS ASSOCIATION

van Kleeck, Mary (Vice-President in the U. S. of the International Industrial Relations Association). Human relations in a scientific organization of industry. *Factory and Industrial Management,* Oct. 1929, Vol. 78, 817–818.

Summary of the conference held in Europe.

LABOR BANKING

Wolman, Leo. Labor banking after ten years. *Advance,* Aug. 23, 1929, Vol. 15, 3.

Reprinted from the *New Republic,* Aug. 21, 1929.

LIBRARIES

Thompson, Laura A. (Librarian, United States Department of Labor). National library service for labor. *American Federationist,* Aug. 1929, Vol. 36, 947–948.

MACHINERY IN INDUSTRY

Mitchell, Wesley C. (Director, National Bureau of Economic Research). Machines make jobs. *Nation's Business,* September 1929, Vol. 17, 43–45, 110, 112.

Although machinery is often blamed for unemployment, a recent survey of the nation's life indicates that machines make jobs.

MUTUAL BENEFIT ASSOCIATIONS

Mutual benefit association accomplishment. *Service Letter on Industrial Relations*, August 5, 1929, No. 39, 3–4.

Statistics covering a group of associations in eleven plants.

OCCUPATIONS

Retail Credit Co. Lumber industry-logging. *Industry Report*, September 1929, Vol. 4, 10–16.

A "classification of jobs" for the industry is included in this report as in all previous Industry Reports. Names of all jobs are listed alphabetically with a brief job description. The particular type or class of work is given in parenthesis and a complete index to jobs is appended.

PENSIONS

Status of old-age pension legislation in the United States. *Monthly Labor Review*, July 1929, Vol. 29, 21–28.

RATING

BERGER, GEORGE G. (Consulting Industrial Engineer, New York). Method of measuring and rating management. *Bulletin of the Taylor Society*, August 1929, Vol. 14, 173–179.

An analysis of the various phases of management resulting in the setting of standards for comparison with performance.

RESEARCH

Railway employees research foundation. *Monthly Labor Review*, September 1929, Vol. 29, 549–550.

The Railway Labor Research Foundation has recently been organized by leaders of several railway labor unions. The purposes of the new undertaking are here set forth. The initial work of the foundation will be a study of the achievements under the notable Baltimore & Ohio coöperative plan. A list of the board of directors of the foundation is given in this article.

STATISTICS—INCOME

American Association of Advertising Agencies—Research Department. Average American family income reported $2,000 to $5,000. *Domestic Commerce*, Sept. 2, 1929, Vol. 4, 109.

Average of 26,500,000 families.

STOCK OWNERSHIP

Bill prohibiting employees from purchasing employer's stock held unconstitutional. *Monthly Labor Review*, August 1929, Vol. 29, 378–379.

Massachusetts decision.

TEACHING—CASE METHOD

WINGATE, I. B. Case method in teaching personnel management. *Journal of Retailing*, July 1929, Vol. 5, 26–29.

TESTS

PERSONS, W. F. Psychologist takes a hand in personnel selection. *Aera*, August 1929, Vol. 20, 462–467.

The article is a description of the psychological tests employed in the Milwaukee Electric Light and Power Company.

Following a well planned personality interview, the prospective operator is subjected to a series of psychological tests and his reactions are automatically recorded on a mechanism designed for the purpose. In this manner candidates who are inherently unqualified for service are eliminated before training reaches the platform period.

TRAINING APPRENTICES

BIEHL, JOHN F. (Laidlaw Works, Worthington Pump and Machinery Co., Elmwood Place, Ohio). Apprentices trained four years. *Iron Age*, Aug. 8, 1929, Vol. 124, 333–336.

Worthington Company program includes both practical training and class room work—junior student engineers' course also conducted.

TURNOVER

BERRIDGE, WILLIAM A. (Economist, Metropolitan Life Insurance Company). Labor turnover in American factories. *Monthly Labor Review*, July 1929, Vol. 29, 62–65.

Indexes of national labor turnover in

factories are given monthly from 1919 to May, 1929, showing five variables: accession rate, total separation rate, voluntary quitting rate, discharge rate, and lay-off rate. This is the result of a project undertaken by the Metropolitan Life Insurance Company more than three years ago. As both the company and the Bureau of Labor Statistics feel that the project has passed the experimental stage the enterprise has been transferred to the bureau, which in future will itself handle the compilation, analysis, and announcement of results each month.

WAGES

Alford, L. P. (Consulting Engineer). High wages—high production. *Factory and Industrial Management,* September 1929, Vol. 78, 549–551.

"No trends in industry are more firmly set than these two associates, higher wages and shorter working hours. . . . They will persist, and the industrial manager who determines his operating policy in line with them will be adding another element to insure the success of the concern."

Bresciani-Turoni, C. Movement of wages in Germany during the depreciation of the mark and after stabilization; with discussion. *Royal Statistical Society Journal,* 1929, Vol. 92, Part 3, 374–427.

WAGES—PAYMENT METHODS

Barnes, Ralph M. (University of Iowa). Point system of wage payment. *Factory and Industrial Management,* Sept.–October, 1929, Vol. 78, 566–568; 831–833.

The first part of this article deals with the practical setting of standards and computation of earnings under the point plan of payment. In the second installment is shown how the plan facilitates cost computations, and points to the comparative advantages and drawbacks of this widely used plan.

WOMEN

Steinfeld, Marguerite. What the government tells about working women. *American Federationist,* August 1929, Vol. 36, 988–995.

The publications of the Federal government which give information on working women are outlined to show those which deal with: 1. The number of working women; 2. The types of work they do; 3. Their wages; 4. Their hours of work; 5. Their protection.

Annual Fall Conference

of the Personnel Research Federation

The Editor offers the following statement as a preface to the current number of the PERSONNEL JOURNAL, *whose pages he is confident will be read with exceptional profit.*

NOTABLE forward steps in the scientific solution of problems of occupational adjustment were strikingly exemplified in the series of papers and addresses presented November 15 and 16 at the Eighth Annual Fall Conference of the Personnel Research Federation. Several of these contributions are offered to our readers in this number of the PERSONNEL JOURNAL.

Of outstanding interest to business executives, psychologists and students of industrial relations was a series of papers based upon investigations in progress for the past two and a half years in the Hawthorne works of the Western Electric Company.

The first of these, by Mr. G. A. PENNOCK, describes an experimental investigation of individual variations of output as related to such variables as mental attitude and physiological condition, rest periods, length of working day, method of wage payment and character of supervision.

Such scientific study of human behavior in an industrial environment has its difficulties. Emotions and personal reactions are less readily subject to experimental control than are microbes and molecules. The apparent impossibility of bringing this field of exploration clearly within the range of laboratory methods has retarded the growth of exact knowledge. Yet some such approach is indispensible if there is to be a science of industrial relations.

The Hawthorne studies illustrate the search for experimental methods adequate to this complicated task. They have been perhaps unexpectedly rewarding in their practical outcome. One of the findings tends to show that of all the various influences and working conditions which so far have been investigated, no factor is more potent than the employee's response to a genuine personal interest in him on the part of his immediate supervisors. Thus the by-products of this research far outweighed the direct returns, which were, nevertheless, considerable.

One of these practically significant off-shoots of the original investigation is "A Plan for Improving Employee Relations on the Basis of Data Obtained from Employees." This plan, described by Mr. M. L. PUTNAM, begins with the training of selected workers to interview other workers, thus enabling the employees readily to communicate to the management whatever they may want to say. Information is then obtained as to what the workers like or dislike about their conditions of work and their personal relations. This information, disguised to preserve anonymity, supplies concrete materials for discussion in biweekly conferences of the supervisors. It is also used in improving working conditions.

The vitality which this procedure has brought into the supervisory training program is reflected in the workers' responses to the greater personal interest and consideration they are receiving.

The significance of the newer ideals of control illustrated in these Western Electric investigations, is vividly presented by Professor ELTON MAYO in his paper on "Changing Methods in Industry."

Professor JOHN DEWEY, speaking on "Psychology and Work," gives the emphasis of his ripe wisdom to the value, both industrial and social, of securing for the worker, as the Western Electric plan does, some personal recognition, with opportunity to realize that he individually counts in the enterprise, and that the way is open for him to make his intellectual as well as manual contribution to its success.

"Fatigue, Morale and Output" is the theme of an address by Mr. STUART CHASE, student of the machine age and of its effects, good and bad, on men.

The New York State Industrial Commissioner, Miss FRANCES PERKINS, discusses aptly "Government's Part in Solving Modern Work Problems." Government has three chief duties: to enforce minimum standards of decency in the treatment of men and women in industry; to furnish a soil favorable to the development of experiments and inventions of better techniques in all matters having to do with the improvement of human relationship to industrial life; and to serve as an educational influence, to spread among all employers the knowledge of these better techniques that cut down costs of production and improve conditions for the workers. Some problems at present calling for research are: how best to train employees in safe work habits; how to make industrial life for individuals an educational experience; how to remove the fear of old-age dependency through insurance and pension plans without at the same time hampering older workers in search of employment; and how to determine optimum length of working day in differing industries.

Ways of anticipating in advance of training the likelihood of a young man's success in an occupation were illustrated by DON S. TAYLOR, in his report of progress on a three-year investigation of "Abilities of Young Printers." The first stage of this research was described in the PERSONNEL JOURNAL for June 1929.

"What Preachers Do: A Time Analysis of Activities of Ministers and Church Staffs," by Dr. H. PAUL DOUGLASS, of the Institute of Social and Religious Research, illustrated the extension of techniques of occupational study into professional fields, and furnished a basis for conclusions regarding organization of work as well as selection and training of personnel to do it.

Mr. Owen E. Pence and Dr. Lester W. Bartlett described three years of notable progress on The Young Men's Christian Association five-year program of personnel research. This extensive and thoroughly fundamental coöperative inquiry was outlined in its many aspects. Special emphasis was placed on the methods used in the studies of the selection and training of physical directors and of YMCA secretaries, recently published by the University of Chicago Press.

These reports brought to a close the best meeting the Personnel Research Federation has ever held. Eight years ago the programs consisted largely of plans and proposals for research. Now they are mainly devoted to descriptions of actual accomplishment in applying the point of view and the techniques of science to the socially significant task of occupational adjustment.

Industrial Research at Hawthorne

An Experimental Investigation of Rest Periods, Working Conditions and other Influences

By G. A. Pennock, *Western Electric Company, Chicago*

If there is to be a science of industrial relations, there must be a scientific approach by industry to the problems of industrial relations. This article is an account of how the Western Electric Company in their Hawthorne Works at Chicago is finding such methods of approach.

Mr. Pennock, Assistant Works Manager, was Superintendent of Inspection when, early in 1927, he and his associates initiated these experimental studies of influences affecting employees' effectiveness and mental attitude.

The results of these studies have been rather startling, and are deemed of such importance that a larger program of employee relations research has been launched. The present as well as the future findings of these experimental studies will undoubtedly form a valuable contribution to the science and art of human management.

The procedure and findings of test-room studies for a period of over two years are described. Constant observation and experimentation was made with a group of five women workers engaged in repetitive assembly work in an effort to determine the answers to such questions as the following:

Are rest periods desirable?
Is a shorter working day desirable?
What effect do wrong or right methods of supervision have on a worker's effectiveness and morale?
What are some of the factors that determine an employee's mental attitude?

A second test group consisting of five operators who were splitting mica was also studied.

The method consisted in maintaining all conditions as nearly constant as possible, with introduction from time to time of a single variable, such as a different method of payment; rest periods; mid-morning lunches; shorter or longer working day. Information as to amount of sleep, recreations, home conditions and other outside influences, as well as personal influences within the factory such as the relationship between the superviser and the operators, were secured through informal interview. Pulse rate, blood pressure, blood condition readings, vascu-

lar skin reactions and other physical examination data were obtained from time to time. Diet and health practices were recorded.

The most surprising outcome was, that productivity of the test group tended in general to increase no matter what changes in working conditions were introduced. Fatigue was found not to be a controlling factor. Amount of sleep had a slight but significant effect on individual performance. Total daily production was increased by rest periods. Home conditions and other outside influences tended to create either a buoyant or a depressed spirit which modified production. Emotional status was reflected in performance; and the major component of this emotional condition was attitude toward supervisor. The inference from these studies was inescapable that the dominant factor in the performance of these employees is their mental attitude.

Consideration of the sensitiveness of the operators to the way in which they are treated lead to studies of other workers' emotional status and attitudes. All operators in the Inspection Organization were interviewed, to secure a picture of their problems, worries, likes and dislikes, in relation to working conditions and supervision. This program is spreading to other departments, and is greatly modifying supervisory training procedures. Rest periods have also been introduced into several operating departments, affecting 5,000 employees, with indications of increases of production paralleling somewhat those of the test group.

LIKE many other industries, we have in the past endeavored to administer a personnel program through executive thought and application rather than through a strictly scientific approach to some of the problems of employee effectiveness. Feeling the need for some more accurate scientific data as a basis of further action, we have for the past two and one half years been conducting certain test studies under laboratory conditions. What these experiments are, how they have been conducted, and what additional light they have thrown upon the field of industrial relations are the matters to which we shall give our attention in this paper.[1]

Before we enter into a direct discussion of these experimental studies, it will perhaps be helpful if we describe briefly the setting or background of the general plant and physical conditions under which the tests were made.

Our field of observation is the Hawthorne Plant of the Western Electric Company where forty thousand men and women are engaged in manufacturing telephone apparatus and associated equipment. The plant is well located and modern in construction. Well-tried policies for personnel work in placement, training, vocational guidance, recreation, and adjustment of working conditions are in operation there. Employee relations activities include a well organized safety program; a Company-operated benefit plan, which provides pensions for employees of long service and liberal allowances for employees who become sick or injured; a savings plan; a plan enabling employees to purchase American Telephone and Telegraph stock on favorable terms; a restaurant, cafeteria, and lunch service, which supply the employees with food at cost; and the Hawthorne Club, the employee organization which provides athletic recreation and social programs, maintains a store, a Building and Loan Association, and at the same time operates an evening school with over three thousand students in attendance.

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[1] I wish to acknowledge the invaluable assistance rendered by Professor Elton Mayo of the Harvard University Graduate School of Business Administration and Professor Clair E. Turner of the Department of Biology and Public Health of the Massachusetts Institute of Technology.

Both of these men have been intimately connected with the study almost from its inception. Professor Mayo has taken a keen interest in this work and also the work to be described by Mr. Putnam. We are deeply indebted to him for encouragement and valuable advice and suggestions.

Dr. Turner has advised regularly with those in charge of the experiments and all data as collected have been submitted to him for analysis. He has compiled the detailed reports, studied the literature on the subject and rendered much valuable service.

The management feels that employee morale in the plant is high. Shop supervision and employee relations have been and are relatively good. We have never had any serious labor problems. While we believe our personnel program has been sound and has contributed largely to the favorable conditions existing at Hawthorne, it must be recognized that such programs in every industry have been developed almost entirely on the basis of executive judgment, rather than upon the basis of actual data or facts.

This, in brief, is the background on which we have endeavored by our test studies to shed light on the subject of "humanizing industry." We do not wish to maintain that the methods used constitute an entirely new invention, or that the results obtained will furnish a panacea for all industrial ills. We do hope that we can contribute something to the progress of the science and art of human management, and that out of our efforts will come some valuable criticisms concerning the procedures which have been followed, and some constructive suggestions toward further development of studies of this type.

The origin of these studies dates back to the early part of 1927, when the Company in coöperation with the National Research Council had just finished some studies of illumination and its relationship to the productiveness of industrial workers. Obviously we cannot go into a discussion of that test here. It is enough to say that we gained from it valuable experience in the technique of conducting tests involving human behavior. We also discovered that light is only one and apparently a minor factor among many which affect output and employee reactions. It was this discovery which suggested to us the use of the experimental method in determining the various factors governing employee effectiveness. Certainly, such knowledge would be a valuable contribution to industrial efficiency and to the improvement of employee relations.

The question might be asked at this point as to why we did not conduct the studies on large groups under regular working conditions, as results obtained by this means might carry more weight than results arrived at from small scale test studies.

The answer is that we were convinced from our experiments on illumination, which were conducted in regular shop departments and on fairly large groups of people, that there were so many factors affecting the results and reactions of workers that it was hopeless to expect to evaluate the effect of any single factor in the results.

While we have not been able in the test group to test for the effect of single variables, we have been able to reduce the number of variables considerably. Such factors as amount of work ahead of the operators, changes in types of work, the introduction of inexperienced operators, and building up or reducing the force—all of which have a decided effect on the operators' morale and efficiency—have been largely eliminated in the test group.

As our first step we set aside in April, 1927, a test group for observation and experiment. So far as we could visualize, our objective was to find the answers to such questions as the following:

1. Do employees actually get tired out?
2. Are rest pauses desirable?
3. Is a shorter working day desirable?
4. What is the attitude of employees toward their work and toward the Company?
5. What is the effect of changing the type of working equipment?
6. Why does production fall off in the afternoon?

Looking back after two and one half years, we now realize that we did not have the real question in mind at all. Were we to add it to the list now as No. 7, it would read about as follows:

> What effect do right and wrong methods of supervision have on the operator's effectiveness and morale?

We did, however, have a distinct feeling that we were not at all sure just what we were setting out to test, but felt that there was something to be learned from the operators if we could establish the proper relationship with them.

We may as well admit here, too, that we were so sanguine as to believe that the answers would be forthcoming in six months or a year. But instead of finding the answers and closing the books, our investigation uncovered so many other interesting problems that after two and one half years we feel that this field for scientific research has scarcely been touched. We cite these questions here not as questions to which, in all cases, you can expect a definite answer in this paper, but rather as an indication of our starting point with its somewhat limited horizon. How we set out to find these answers and where our journey led us we shall now discuss.

Six experienced female operators were chosen at random. Their work was the assembly of telephone relays, which consisted of putting together a coil, armature, contact springs, and insulators in a fixture and securing the parts in position by means of four machine screws. This operation can be done at the rate of about one assembly a minute. A man from the Piece Rates Setting Department was selected to supervise and observe the test.

Five of the girls were to do the actual assembly work, while the sixth was to stock and procure parts for

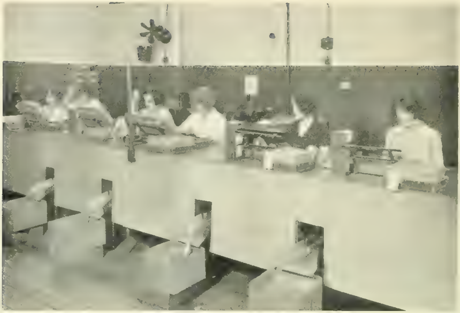

Fig. 1. The Relay Assembly Test Room

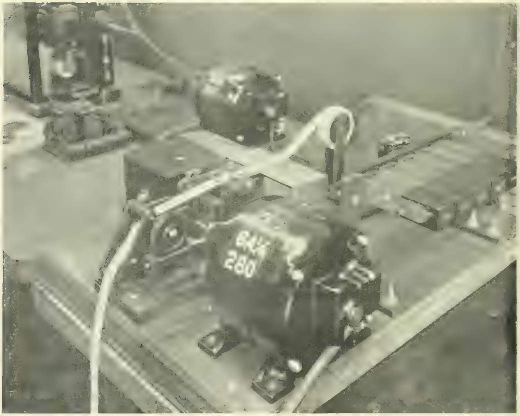

Fig. 2. The Device for Recording Productivity in the Relay Assembly Test Room

Fig. 3. The Tape on Which Is Recorded the Performance of Each Operator in the Test Room

each assembly operator. The nature of the test was carefully explained to these girls and they readily consented to take part in it, although they were very shy at the first conference. An invitation to six shop girls to come up to a superintendent's office on the top floor was naturally rather startling. They were assured that the object of the test was to determine the effect of certain changes in working conditions, such as rest periods, mid-morning lunches, and shorter working hours. They were expressly cautioned to work at a comfortable pace, and under no circumstances to try to make a race out of the test.

The test room, as seen in figure 1, is merely a corner of a regular shop room enclosed by partitions. The work bench and assembly equipment is practically identical with that in the regular department except for one item. At the right of each girl's position is a hole in the bench into which completed relays are deposited. This hole is the entrance to a chute in which there is a flapper gate actuated by the relay in its passage. The openings of the gate closes an electric circuit which controls a perforating device which records the completion of the relay by punching a hole in a moving tape. (See fig. 2.) This tape moves at the rate of one-quarter of an inch per minute and has space for a separate row of holes for each operator. It thus constitutes, when punched, a complete output record for each girl for each instant of the working day. This is shown in figure 3. Temperature and humidity readings are made hourly. Remarks made by the girls and any happenings thought significant are recorded on a log sheet by the test observer.

This, briefly, is a description of the physical details and procedure for setting up the tests. Since most of the data shown are in terms of production, it may be well to state that this is used purely as a measure of the combined effect of the conditions imposed. This is one of the few quantities susceptible to exact determination, and though a poor measure, seems to be about the only one available.

As a base output, a record was kept for two weeks on each test operator in her regular department and under her regular conditions (without her knowledge) before she was moved to the test room. This constituted the first or base period of the test. We now appreciate that this base period was probably too short. Following this, the girls were moved into the test room where for a period of five weeks no alterations other than the changed location were made in the conditions of work. There was no appreciable change in output following this move.

For the third period, consisting of eight weeks, the first major variation of the test was introduced. The five girls were placed on a group piece rate salary basis independent of the large group with which they were previously identified. This meant that each girl would earn an amount more nearly in proportion to her individual effort since she was paid with a group of five instead of a group of one hundred.

Following this period, the test group has been taken through twelve periods. A brief study of figure 4

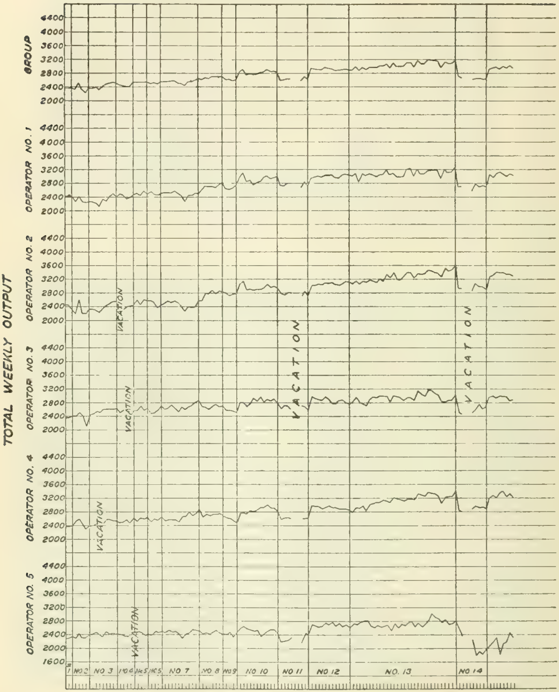

FIG. 4. THE PERFORMANCE CURVES FOR EACH OPERATOR AND FOR THE GROUP SHOWING THE WEEKLY VARIATIONS IN PRODUCTIVITY SINCE THE RELAY ASSEMBLY TEST BEGAN

Periods of the test are separated by the vertical lines. The test conditions in each period are shown in table 1.

TABLE 1

Summary of test periods, relay assembly group (see fig. 4)

PERIOD NUMBER	PERIOD NAME	DATES INCLUDED	DURATION	BEGINNING OF REST PAUSES	
				A.M.	P.M.
	1927				
			weeks		
1	In regular department	4–25 to 5–10	2*	None	
2	Introduction to test room	5–10 to 6–11	5	None	
3	Special gang rate	6–13 to 8–6	8	None	
4	Two 5-minute rests	8–8 to 9–10	5	10:00	2:00
5	Two 10-minute rests	9–12 to 10–8	4	10:00	2:00
6	Six 5-minute rests	10–10 to 11–5	4	8:45, 10:00, 11:20	2:00, 3:15, 4:20
7	15 minute a.m. lunch 10 minute p.m. rest	11–7 to 1–21–28	11	9:30	2:30
	1928				
8	Same as No. 7, but 4:30 stop	1–23 to 3–10	7	9:30	2:30
9	Same as No. 7, but 4:00 stop	3–12 to 4–7	4	9:30	2:30
10	Same as No. 7 (check)	4–9 to 6–30	12	9:30	2:30
11	Same as No. 7, but Saturday a.m. off	7–2 to 9–1	9	9:30	2:30
12	Same as No. 3 (no lunch or rests)	9–3 to 11–24	12	None	
	1929				
13	Same as No. 7, but operators furnish own lunch. Company furnishes beverages	11–26–28 to 6–29	31	9:30	2:30
14	Same as No. 11	7–1 to 8–31	9	9:30	2:30
15	Same as No. 7, except operators furnish own lunch. Company furnishes beverages	9–2 to present		9:30	2:30

* Approximately.

and table 1 will indicate the varying length of these test periods and the different test conditions introduced into each.

We made it a practice to discuss each proposed change with the group before making it. We tried to make them feel that we wanted their advice. They were told that we would tell them the results as we went along; that we were putting all of our cards on the table and wanted them to be equally frank with us.

From these tests have come some

startling results, startling because they were unexpected as well as because they were sometimes contrary to accepted opinion.

In the first place there was a gradual yet steady increase in production regardless, to a certain extent, of test conditions imposed. For some operators this increase has run as high as 35 to 50 per cent. And the study has continued too long for us to attribute this increased production to the novelty of being placed under observation. The highest productivity yet reached was recorded in period 13, during which the operators had a fifteen minute rest and lunch period in the morning and a ten minute rest period in the afternoon. The lowest period of productivity was the second, which was the first one in the test room with no change from regular working conditions. However, as has been stated, the production in this period was practically the same as the base production.

Now this unexpected and continual upward trend in productivity throughout the periods, even in period number 12 when the girls were put on a full 48 hour week with no rest period or lunch, led us to seek some explanation or analysis. Observation and study suggested three possible factors which might contribute to this condition:

1. Relief from cumulative muscular fatigue.
2. Change in the pay incentive.
3. Improved psychological attitude toward the work.

That cumulative fatigue was not present is indicated by the following facts:

The weekly production curve from all test room operators over the period of the study does not show a decline in daily production during the latter days of the week which would be the probable result of cumulative fatigue. The production for Saturday and Monday is low, and that for the other four days of the week is consistently higher.

Vascular skin reaction readings do not show any increase in fatigue.

The gradually rising production over a period of two years indicates the lack of cumulative muscular fatigue.

Regular physical examinations show that the health status of the girls is being satisfactorily maintained and in some cases improved. Comparative figures between the test groups and thirty-three regular operators in their old department are striking. Girls in the regular department, during a six month interval, had about three and one-half times as many sick absences, two and one-half times as many excused absences, and three times as many other absences.

Blood condition readings taken by Professor Mayo indicated conclusively that the physical balance of the operators was being maintained. Figure 5 charts the condition of one of the regular test room operators and shows a steady maintenance of organic equilibrium (or physical status), while fig. 6 charts the condition of one of the girls in the regular department and shows a fluctuating or irregular health status. It is interesting to observe that at the time this condition was noted in the readings of this operator, it was decided to see her in her regular department and suggest that she consult her doctor about her health, but the girl was absent on account of sickness.

It might be interesting to observe one particular case which illustrates the effect of health on the operator's performance.

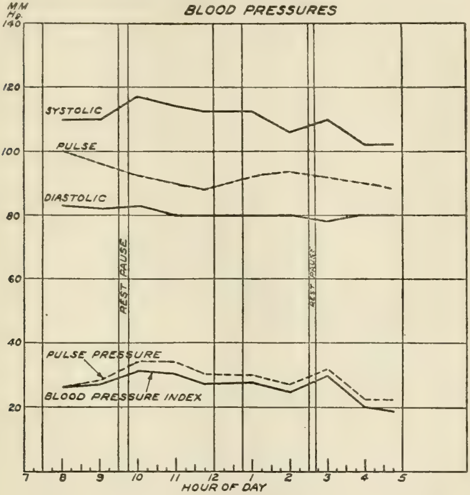

FIG. 5. BLOOD PRESSURE READINGS FOR ONE OF THE TEST ROOM OPERATORS

About six months after the beginning of the tests one of the operators began remarking to the other girls that she did not intend to work her head off for any one and made several other comments that were hard to reconcile with her previous attitude, which had been enthusiastic. We had several talks with her but were unable to learn the cause of the trouble. Her output was dropping while the output of the other girls was increasing, and they were beginning to criticize her for not doing her share. We then decided that it would be best to take her out of the test group and she was put back in the regular department. Shortly after this, in looking over the medical records, we discovered that this girl had developed an anemic condition indicated by a red blood count of 3,500,000. We then had a talk with her and suggested that she take some treatment, to which she readily agreed. Her blood count came up to 4,600,000 in three weeks and she is at present in the best of health. It is now quite apparent that her physical condition accounted for her drop in output and when the other girls began to criticize her, her only defense was to talk as she did.

As to the influence of the second factor, *viz.*: a change in method of payment on the results, in an attempt to obtain more exact knowledge as to the magnitude of the influence we established two other test groups.

The first was another group of relay assemblers, which, you will remember, perform the same operation as that performed by the original test group. Our idea was to keep them in their department under regular supervision and with the same working conditions and change only their basis of pay. For a period of five weeks, to serve as a basis for future compari-

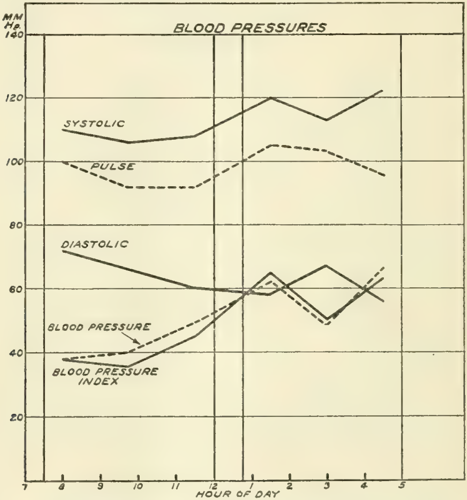

FIG. 6. BLOOD PRESSURE READINGS FOR ONE OF THE OPERATORS IN THE REGULAR DEPARTMENT

son, the production record of five girls was kept without their knowledge. They were then told that they were to be formed in a separately paid group. During the first week on this basis their average rate of output increased 13.8 per cent. About the same ratio was maintained for five weeks after which a return was made to the former pay arrangements. The operators' reaction to this was not favorable, and a tabulation of their output for seven weeks showed that it ranged from 5 to 10 per cent below that of the base period.

The second group was formed with the idea of making no change in basis of pay but to establish test conditions similar to those prevailing in the original test group. We chose five experienced mica splitters for this group. The job consists of splitting pieces of mica about $\frac{3}{32}$ of an inch thick into sheets approximately $\frac{1}{1000}$ of an inch thick. A needle is used to make the separation. These girls are paid on an individual piece-work basis, so no change in method of payment was necessary. A base output record was obtained by observing them in their regular department for a period of eight weeks and they were then transferred to the test room where the conditions are the same as for the original group of relay assemblers and where they are now going through the same cycle of observation periods.

And now comes the interesting thing about this group.

From the beginning of their work under test room conditions, one year ago, these operators have shown a steadily increasing production which at present is 20 per cent above their base rate.

The first of these tests—*viz.*, the relay assemblers set aside in the regular department—indicates increased output with increased pay incentive but a much lower increase than shown by the regular test-group. The second test, the mica group, shows a larger increase in output with no change in pay incentive.

At this point it will be interesting to digress for a moment to describe two extremely interesting cases in the mica group.

The first is the case of an operator forty years of age who had been somewhat of a problem for many years. She is a widow with two children. Her married life was unhappy and she has been in almost constant financial difficulties. She is a nervous type and before she was placed in the test group was frequently absent because of nervous breakdowns. Since joining the test group she has shown the most consistent gain in output of any of the operators, has gained in weight, and her absences have decreased to one third the former rate. She is now subscribing to two of the Company's savings plans, and while as a mental case she is not cured, there has been a remarkable improvement.

The other case is that of a girl eighteen years of age, whose output has been the lowest and most erratic of any of the five operators. This girl was living at home and her mother apparently was everything that a mother should not be. The girl was forced to turn over to her mother every cent she earned and was allowed practically nothing to spend on herself. About three months ago the girl reached the limit of her endurance, left home, and is now living with a friend

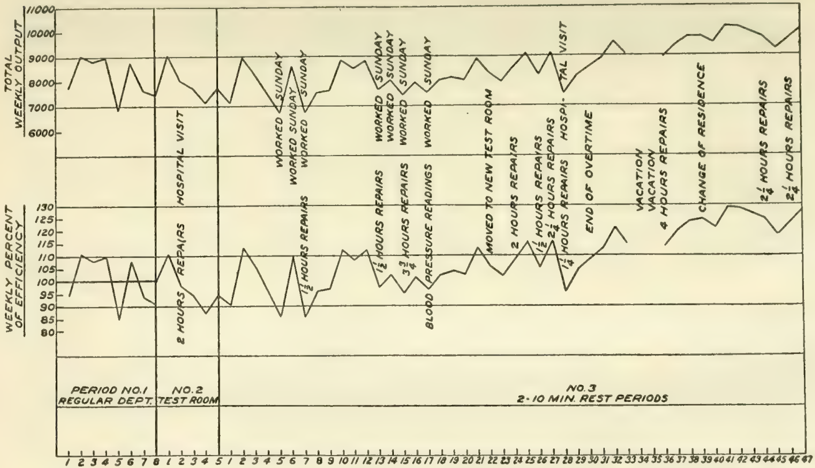

FIG. 7. THIS CHART SHOWS IN GRAPHIC FORM THE EFFECT OF HOME CONDITIONS UPON THE PERFORMANCE OF ONE OF THE OPERATORS IN THE TEST ROOM STUDIES

For approximately thirty-five weeks, her variation in work was greater than that of any other operator. Then, because of her unfavorable home situation, she decided to live with one of her friends in a small apartment. Her performance was immediately steadier and higher even though she had not yet changed her residence. Following her move, at the end of the thirty-ninth week, the chart shows that her performance was lower in the fortieth week and then reached even greater heights for a time.

in a small apartment. Immediately after she had decided to make this change, her output curve smoothed out to a remarkable degree, and her total output now shows the highest percentage gain of any operator in the group. Figure 7 shows the variation in her performance both before and after the change in home conditions.

Now to resume our discussion of the main topic. We have shown that fatigue is not a governing factor in the performance of the test group, and have partially evaluated the effect of increased incentive due to change in method of pay, which leaves us convinced that the rather remarkable results we have been able to obtain with this group are due mainly to changes in their mental attitude. This we consider the major accomplishment of our entire study.

Confirming this belief there are many items of evidence. A relationship of confidence and friendliness has been established with these girls to such an extent that practically no supervision is required. In the absence of any drive or urge whatsoever they can be depended upon to do their best. They say they have no sensation of working faster now than under the previous conditions, and that their greatly increased production has been accomplished without any conscious effort on their part. Comment after comment from the girls indicates that they have been relieved of the nervous tension under which they previously worked. They have ceased to regard the man in charge as a "boss". Specific and individual studies which were made prove for these girls what you know about yourself—that you can work much more efficiently in a contented frame of mind than you can when your mind is in a turmoil of worry, fear, or discontent. You don't know exactly what it is that makes you produce more; neither do these girls. Yet they have a feeling that their increased production is in some way related to the distinctly freer, happier, and more pleasant working environment.

A record showing the comments of the girls, answers to many questions asked, and the closer relationhip development between operators and supervisors all show that the test room operators have consistently developed a more contented outlook on everything. As they express it themselves, they are even anxious to come to work in the morning.

A few comments of the operators might be of interest at this point. One girl after being moved into the test room said, "I liked it here from the first day. It's nice and not so crowded." Another, when the five-minute rest periods were introduced, announced in quite modern style, "Gee, that's the berries! It rests you to have five minutes like that!" "I hope I never see a gang boss again. We don't have to worry about getting bawled out about our rates up here." (This had reference to a practice then in vogue in her old department of checking the girls every day against a bogey.) Of the three five-minute rest periods morning and afternoon a representative comment was, "I don't like these rest periods; they break things up too much." One operator early in the test period told us that on the first day of the test she assembled thirteen thousand parts and only twelve thousand on the second day. She came in the third day expecting to be asked to explain, or as she put it, "bawled out." When this did not happen she assembled over 13,000 parts on the third day.

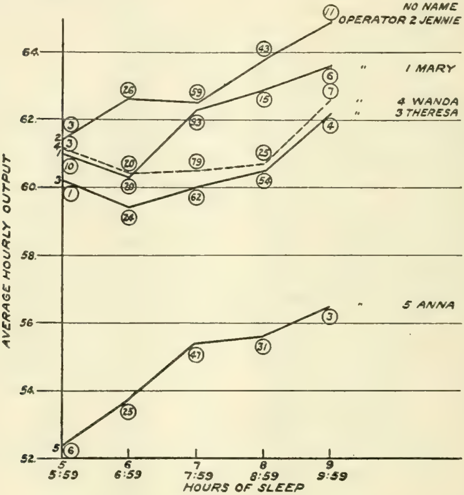

Fig. 8. Each Column in This Chart Shows Average Performance, for Each Operator in the Relay Assembly Group, during the Days in which the Previous Night's Sleep Varied between the Hours Shown on the Base Line Scale

The figures enclosed in circles show the number of instances averaged

"I wish this test would last for two years," was another comment. Of the combination lunch and rest one girl had this to say: "Gee! That was swell! You feel like working now!"

The most significant comments and the ones that were the most unexpected and valuable were those concerning supervision in the old department.

It had been our feeling that the department from which these operators came, *viz.*: the relay assembly department, was one of our best supervised departments. The Foreman has a good personality and an interest in his employees, and we had assumed, without knowing, that his methods of dealing with people were being used by his section and group chiefs. The Foreman had also, without knowing, made the same assumption.

We were surprised to learn from the test operators that there were supervisors in the department who kept their operators in a constant state of worry and fear. One section chief got his operators into such a state of fear that some of the more timid ones actually cried if he looked at them continuously for a few minutes. Others occasionally called up to say they were sick rather than face him in the morning after a low output day.

The disclosure of such conditions in one of our departments was disconcerting, and it faced us with a serious problem to be solved. How we set about to solve it will be referred to later.

In connection with the experimental studies, the home environment and outside activities of the test room operators have been carefully studied. Thorough physical examinations have been given periodically, and a record of diet and health practices has been kept. Also pulse-rate, blood pressure, and cardio-vascular skin reaction data have been recorded at various intervals. We shall take time to enumerate here only a few interesting observations obtained from these findings:

1. The amount of sleep has a slight but significant effect upon individual performance. (See fig. 8.)
2. A distinct relationship is apparent between the emotional status or home conditions of the girls and their performance.
3. Total daily productivity is increased by rest periods, and not decreased.
4. Outside influences tend to create either a buoyant or a depressed spirit which is reflected in production.
5. The mental attitude of the operator toward the supervisor and working and home conditions is probably the biggest single factor governing the employee's efficiency.

As an illustration of the effect of home conditions, the following case is of interest: About a year ago the output of one of the best producers in the test group declined steadily for several days, and she seemed quite depressed. We got her story, which was this: She had a boy friend who was of different nationality and her mother who had been worrying over this situation for some time had recently decided that the girl had to make a change and get a beau of her own nationality. Fortunately the mother relented in a few days, and her spirits arose and her output increased to normal.

I have attempted up to this point to describe to you how the tests were conducted and some of the findings and conclusions, and it would seem quite natural for you to ask this question: What practical use have you been able to make of your test results, and how do you plan to remedy the defects in supervision brought to light by the test group? The answer to this question, far too lengthy to be included here is contained in another paper entitled "A Plan for Improving Employee Relations on the Basis of Data Obtained from Employees," which will be given by Mr. Putnam.

Briefly stated, our findings so far and a consideration of the sensitiveness of operators to the way in which they were handled suggested to us the desirability of additional research in the field of their emotional status, mental attitudes, working conditions, and supervision. As a result we set out upon a program of interviewing all the operators in the Inspection Organization in an endeavor to secure a clear picture of their problems, worries, likes, and dislikes, as these might be related to the factors just mentioned.

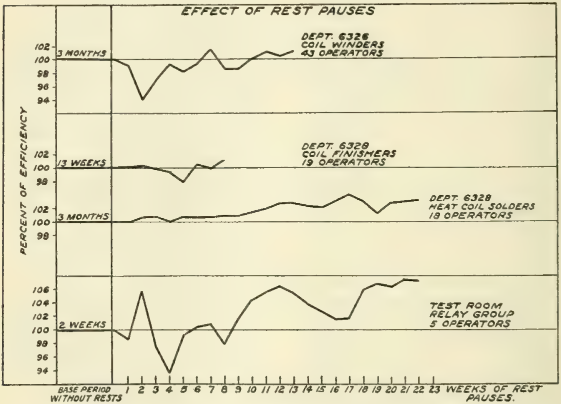

FIG. 9. TRENDS IN PRODUCTIVITY FOR SEVERAL SAMPLE GROUPS IN SHOP DEPARTMENTS HAVING REST PERIODS

The straight line during the base period is average performance before rest periods were started.

In degree of importance and significance of findings, this program has already eclipsed the test studies which fostered it, and which we have been discussing throughout this paper. The program is spreading to the other departments of the Works, and out of it has grown an entire supervisory training program based upon its findings. The continuation of our experimental studies and the administration of the interviewing and supervisory training programs have become for us a large administrative project necessitating the formation of a new organization known as the Industrial Research Division.

As another result or by-product of our experimental studies we have introduced rest periods into several of the regular operating departments. This was done to ascertain the effect on production. Up to date, the rest-period schedule has been extended to include approximately five thousand employees, and while all the data have not yet been compiled, the part completed shows an increase in production paralleling in some respects that of the original test group. Reference to figure 9 will indicate the extent of this increase.

As I have indicated throughout this discussion, the original scope of our studies has become so broad and has led us into so many interesting by-paths that we ourselves have been continually amazed by and absorbed in the discoveries at each new turn in the road.

Many additional questions have suggested themselves to us since these studies were started, such as—

1. What factors contribute to the amount of defective work turned out?
2. Does the weather affect production, and if so, in what way?
3. Is there a relation between the volume of noise and the number of accidents, absences, sicknesses, and general irritability? What is the effect of music?
4. How should rest pauses be utilized?
5. What would be the effects of beautifying the worker's surroundings?
6. Is overtime work worth while?
7. Is it worth while to teach employees rudiments of economics which would give them a better understanding of matters such as wage bases and labor turnover?
8. Is it desirable for employees to know the rate at which they are working? Do they limit production deliberately?
9. What are the effects of frequently changing the work of the operators from one type of equipment to another, with which they may be either familiar or relatively unfamiliar?
10. Is there a relation between nationality, mental type, amount of education, physical fitness, and the frequency of accidents?
11. Is it desirable to hold to certain ratios of nationalities within certain working groups?
12. What would be the effect of taking down the test room partitions?

While we believe that the test room method has justified itself as a sane, constructive, yet relatively inexpensive method of studying and improving employee effectiveness, we cannot hope to find, nor do we recommend, any specific formula for the cure of all industrial ailments. But if we can by such studies, or if the general field of industry can by its combined strength, find ways of bringing heart and soul, courage and contentment, life and laughter, into the lower ranks of industry, then we shall have passed many milestones upon the highway of human progress, and life for all will have become less of drudgery and more of joy.

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Improving Employee Relations

A Plan Which Uses Data Obtained from Employees

By M. L. Putnam, *Western Electric Company, Chicago*

Experimental studies of industrial behavior sometimes unexpectedly reveal answers to questions of greater practical moment than those toward which inquiry was first directed. One of these valuable by-products is here described by Mr. Putnam.

In studying a group of relay assemblers under laboratory conditions, at the Hawthorne Plant of the Western Electric Company, it was observed that the increase in employee effectiveness was more closely related to an improvement in the mental attitudes of the subjects than to any of the major variations introduced during the experiment. The conversation of the group studied indicated that altered working conditions and relative freedom from traditional supervisory practices were the chief factors contributing to their improved mental outlook. These observations suggested that a plan for improving the attitude of employees should begin with a consideration of their likes and dislikes.

The plan herein described was evolved as a method for obtaining, applying, and analyzing such opinions. It consists of (1) approaching employees individually and requesting them to express their opinions; (2) of getting their opinions on supervision back to supervisors indirectly by presenting them at conferences; (3) of analyzing and classifying comments as a basis for future plant improvement and research study.

THE test room experiments described in the preceding paper by Mr. Pennock, have, in their brief existence, opened up for exploration many fields worthy of research study. In fact, the history of the original experiments is largely a story of these by-products. Development of them has, of course, been limited by facilities, time, and their prospective value. One by-product, however, seemed to demand immediate investigation and study; and it is with it that this paper is concerned.

For the present it is called "A Plan for Improving Employee Relations on the Basis of Data Obtained from Employees." In the brief course of a year it has outgrown the parent experiment and is of itself generating new by-products and an ever increasing momentum which taxes us to keep pace with its rapidly expanding perspective.

The plan at present has three aspects. First, employees are approached and asked to express themselves about the things they like and dislike relative to their job, the conditions under which they labor, and the manner in which they are supervised. Second, these comments are used as a basis for training supervisors. Third, the comments are analyzed and classified by substance so that a cross section of opinion may be obtained and the causes of unfavorable remarks adjusted.

Before describing more fully these phases of the plan, let me trace briefly the course of its development as a by-product of the test room experiments.

HISTORY AND GROWTH OF THE PLAN

The records of the test room showed a continual improvement in the performance of the operators regardless of the changes made during the study. It was also noticed from the operators' conversation that there was a marked improvement in their attitude toward their work and working environment. This simultaneous improvement in attitude and effectiveness indicated that there might be a definite relationship between them. In other words, we could more logically attribute the increase in efficiency to a betterment of morale than to any of the major alterations made in the course of the experiment. We concluded that the same relationship might exist throughout the entire plant and that the best way to improve morale, which was thought to be at a comparatively high level, was through improved supervision.

At that time we were conducting, by the conference method, a course of training for supervisors in which a series of seventeen discussion subjects was used. Two of these subjects were "Morale" and "Production", which we thought of combining into a series of meetings bringing out by discussion the relationship we had found in the test room between better morale and increased production. So we asked ourselves some questions. "What is 'Morale' anyway?" "What are the factors governing morale?" "What can the supervisor do to establish better morale?" "How can the Company engender better morale through improved policies?" "Just what *is* the present morale of the working force?"

To all of these questions we had to answer, "We don't know!" We had an idea as to the meaning of morale; we had an idea as to what factors govern morale; we had fairly definite ideas about correct supervisory technique; but we had to admit that what we had was *ideas* and not *facts.*

We realized, of course, that most of our supervisory training in the field of employee relations had been based upon theory. Up to this point, supervisors had moulded their opinions by their own experiences, and the composite opinions of a group were thought to be fairly reliable criteria for most supervisory conduct. The subject of "Morale", however, with its importance shown in the test room, and with so many conflicting ideas and opinions about it, seemed to require something more definite and factual before improvement could be made through supervisory training. Consequently, we returned to our test room experience for something to guide us.

It had been found valuable, from time to time, to get from the test room operators their opinions about the changes in conditions due to the test room studies. Their comments were usually offered voluntarily, but in some instances they were asked questions. Quite often they compared their test room conditions with their memories of regular shop conditions. They even told us about a few surprising conditions, the existence of which was not even suspected. In short, they convinced us that although we might have good employee relations policies, there was still much to be desired in their application.

Their comments increased our desire to secure something actual and definite which would make improvements in morale possible. At the same time, they gave us this clue: "Why not gather some facts by approaching employees and asking them to express their comments relative to the things they like and the things they dislike in their working environment?"

This seemed to offer possibilities, and it was decided to try it experimentally in our Inspection Organization which contained about sixteen hundred skilled and unskilled employees, with both shop and office workers represented. All of these employees were to be interviewed, so that a fair picture would be obtained of the things people in various types of work like and dislike.

Considerable planning was done before the employees were approached. The project was new to us and different from anything which had been tried previously in the Company, and it seemed to have its dangers. Possibilities of unfavorable consequences were numerous. Some of the men whose counsel was sought were skeptical. However, careful plans were prepared, and the work was undertaken along lines which may be briefly described.

All the supervisors in the organization to be studied were called together and the plan was explained to them. Their criticism was invited and various points in the plan were discussed. Generally, the plan was subscribed to; only a few of the supervisors were doubtful. Five interviewers were selected from the supervisory group to secure comments from employees. Women were selected to interview women and men to interview men. The interviewers were instructed not to interview employees whom they knew, since acquaintanceship might influence the comments. All comments were to be kept confidential; names or reference numbers were not to be attached to the interviews; and any identifying statements which might reveal the employee or his location were not to be recorded. In order to avoid undue curiosity or skepticism, only a few employees from one location were interviewed on the same day.

When the employee was asked to comment, he was assured that he was invited and not ordered to express himself; for it was felt that voluntary comments would be the most reliable. These comments were recorded and filed with those of other employees in the same group so that studies of comments from employees in the same working environment might be made.

Following these general plans, the interviewing of Inspection Organization employees was started in September, 1928, and completed early in 1929.

In brief, the procedure of the interviewer was as follows:

He approached the supervisor of a group and asked for an employee to interview. An employee was designated and usually introduced to him. If the employee's place of work afforded a chance for confidential conversation, he talked with the interviewer there; if not, they moved to an appropriate location. The interviewer explained the program to the employee in some detail and asked him if he cared to express his views. As the latter talked the interviewer made rather complete notes or took his comments verbatim, depending upon the speed with which the employee formulated and expressed his thoughts. If the employee evidenced a willingness to talk, but was at a loss for something to say, the interviewer encouraged him with questions.

The plan was a success from the start. Most of the employees seemed to enjoy the opportunity to express their thoughts, and even the supervisors became enthusiastic, a few of them asking that they themselves be interviewed. That the interviews contained many illuminating thoughts is illustrated by the following interview which was the first one obtained:

> "I am not satisfied with my progress because I feel my supervisor is holding me down. I have repeatedly asked for a change of jobs to higher graded work in this section and each time I have been told I am being considered.
>
> "Frankly speaking, I feel I am so good on my present job (because I know it was formerly handled by three men) that I feel I have as good as been told they can't afford to give me other work.
>
> "I have often been told, and there has been no doubt they let me know, that my work is very good; but at wage revision time I don't believe they do all they can for me. They explain they are trying to fix up the men who are on higher rated work.
>
> "There are times when my boss is inclined to be a little short and crabby, but not often.
>
> "Other than what I have stated, my supervisors deal fairly with me, and you can always talk to them.
>
> "I find my job interesting."

This interview, which is representative of those we obtained in the early stages of the program, differs from subsequent interviews in that the latter usually contain comments on a greater variety of topics. In general, the employees spoke frankly, and their comments were just as illuminating and interesting as those in the interview cited.

We expected the interviews to yield basic material for more effective supervisory training, but we very quickly found, through several trial conferences with Inspection Organization supervisors, that the interviews themselves, without alteration, served as most excellent material. It was found that one or two employees' interviews served adequately for a two-hour supervisory training conference. Complete notes were taken of the points discussed in these meetings and conclusions were summarized and recorded for the benefit of supervisors and the staff organizations concerned.

The direct comments of employees not only stimulated a great deal of interest in these discussions, but also furnished a very practical approach to supervisory problems. At one stroke they seemed to give the supervisor a better appreciation of the full meaning of the term "supervisor"; challenged him in his own technique; supplied tips on good and bad methods; and inspired him toward self-improvement in the handling of his employees.

Following these trial conferences, meetings were so arranged that each supervisor in the branch met in conference once every two weeks with approximately fifteen fellow supervisors. Conference leaders were selected from among those who started the interviewing work and were thought to possess the necessary qualifications.

In addition to using the comments of employees for supervisory training, it was decided to analyze and study them. At first, only the unfavorable comments were sorted out and studied to see if their causes could be removed. Later, all of the comments, both favorable and unfavorable, were classified and compiled. It was thought that this classification would give a good cross section of employee morale. This list of subjects is interesting because it indicates in a general way the things which employees talk about in their interviews. Comments on supervision are analyzed separately, but usually deal with one or more of these subjects. The present list is as follows:

Absence
Advancement
Aisles
Club for Employees
Dirt
Fatigue
Floor
Furniture and Fixtures
Hospital
Hours
Interest
Light
Lockers
Material
Monotony
Noise
Payment
Placement
Restaurant
Safety and Health
Sanitation
Smoke and Fumes
Social Contact
Steady Work

Temperature
Thrift
Tools and Machines
Transportation
Vacation
Ventilation
Washroom
Welfare
Working Space

While in some respects these subjects seem to overlap, in actual practice they do not. A rather detailed definition of what is to be included in each has been made, and, while this division is somewhat arbitrary, it does give a uniform and exact classification. When a new topic is discussed by an employee, it is carefully analyzed and listed under one of these subjects, or, if necessary, a new classification is added. Thus any of the subject-files may be quickly reviewed for all the comments relating to that particular classification. We not only have the comments filed under the general headings indicated above, but we have, in addition, a file which enables us to locate complaints in specific parts of the plant.

The success of the program in the Inspection Organization indicated the desirability of extending it to other parts of the plant. Starting early in 1929, we undertook to interview employees and offer supervisory training conferences in the Operating Organization. We have now interviewed approximately ten thousand men and women operators and supervisory training is in progress for one thousand supervisors in this group.

CHANGES AND DEVELOPMENTS IN INTERVIEWING

This discussion would not be complete without an account of the changes which have been made within the plan itself during its brief existence.

One of the most important changes pertains to the method of interviewing. We started out with an untrained personnel and scarcely the rudiments of a technique. The method adopted was rather definitely patterned on existing practices. The interviewers knew something of the interviewing done by supervisors, by employment people, and by personnel men; but here was a type of interviewing about which little was known.

One might say that each interviewer was mentally equipped with a set of questions which he expected to have answered by everyone. He was cautioned not to put them to the employees in the manner of a questionnaire; but, notwithstanding, the effect was the same, because he was not satisfied until he had, through direct or roundabout methods, solicited some comment on each one. In other words, our first interviews were opinions, all right enough; but they pertained primarily to what the interviewer and not the employee thought important. The interviewer led the conversation and the employee followed.

As time went on, however, and the staff became somewhat experienced, they gave more and more attention to anomalous and quite unexpected occurrences. Now and then an unusual case was found. An employee would start talking about some point suggested, but in a short time he would be away off the subject. The interviewer would adroitly lead him back to some other point, but in a few minutes he would be back to where he was before. Regardless of what the interviewer said, the employee's thoughts tended to gravitate toward one spot. That something was uppermost in his mind, and it completely overshadowed everything else.

At other times, when the interviewer was about to leave a particularly untalkative person, a casual remark about the weather or some other commonplace would start a train of thought bringing out the person's whole story. We began wondering whether these unexpected outcroppings were just mental aberrations or whether they were indicative of a latent source of information which our interviewing technique normally failed to tap.

The net effect of our first experience was to concentrate our attention upon our method of interviewing. It seemed that there were several serious defects in the direct question method. It might be admirably adapted to getting definite answers to matter-of-fact data such as a physician requires when he is conducting an examination; but if an interviewer were to question an employee closely on a personal matter, he would probably arouse a none-of-your-business attitude and there the matter would end. This attitude may not arise if the questions are confined to objective facts; but even here great care must be exercised, especially near the beginning of the conversation. We find that direct questioning at the start tends to put a person in a "yes" and "no" frame of mind. It tends to arouse a spirit of opposition and a feeling of being examined, which is very difficult if not impossible to overcome once it is aroused. In many cases it causes the employee to think that the interviewer wishes information on a set of questions, and he may be reluctant about deviating far for fear of irrelevance. Furthermore, the direct question elicits remarks upon topics considered important by the interviewer and the employee may never have thought of them before. In fact, it may cause discontent by suggesting that things which the employee thought to be all right are not as they should be.

However, we have not ruled out the direct question as being entirely worthless. Far from it. It may be and is used advantageously by skillful interviewers when they have gotten the person's confidence and the two are on a conversational plane.

While we were in this stage of development, Professor Mayo became interested in the program and gave us of his time and counsel. Through his suggestions and help, and through trial and experience, our present method of interviewing has been developed.

We refer to the method as the "Conversational" or "Indirect Approach." The employee, after an explanation of the program, is allowed to choose his own topic. The interviewer follows his comments in a conversational way or by silence. He takes down the employee's comments as nearly verbatim as possible. No direct attempt is made by the interviewer to suggest a topic or to change the subject before the employee has fully expressed himself. Even then, the employee is encouraged to choose any other topic which he likes. The interviewers have listened interestedly to many subjects. Religion, philosophy, home work shops, childhood experiences, and many others far removed from the working environment are topics which frequently predominate in an interview.

The conversational method seems not only to avoid the pitfalls of the direct question, but it has unique features of its own which are well worth mentioning.

In the first place, it stimulates a feeling of confidence on the part of the employee by making him feel at ease. A congenial atmosphere is created which does much toward allaying nervousness or backwardness.

A second advantage in the conversational method is that the employee benefits from what has been called an emotional release. He may give complete expression to whatever is uppermost in his mind. He has a chance to express all the joys and sorrows surrounding his working environment or even his total social situation. This value in the interviews is one which we were not aware of at the start, but since its recognition we have been better able to appreciate its importance. We are all familiar with the tendency of some people to dwell upon unpleasant thoughts, especially when they believe they have had unfair treatment. As they dwell upon these things, such unnatural or exaggerated proportions are assumed that at times this preoccupation affects and controls their thought processes. An expression of these thoughts to one's friends or one's family may give some relief; but to express them to a representative of the management, who is a sympathetic and critical listener, affords an almost complete release, which tends to bring the individual back to normal and rational thinking. This element in the plan is evidenced by the fact that the interviewers frequently get comments from employees like this; "Gee, I sure do feel better now that I've had an opportunity to get that off my chest," or; "It sure is good to be able to tell someone my troubles because I could never say those things to my boss."

A third advantage in the indirect approach to an interview is the feeling of recognition which the employee obtains. He feels that the management values the comments of his own choosing, and that he is something more than just the source of answers to questions.

Besides the development of an interviewing technique as outlined, many interesting problems and questions have presented themselves. What would be the effect of continuously interviewing a group of employees? What is the immediate effect of interviewing as measured in production? How can the merits of the program be measured by comparison of first and subsequent interviews? These and other such questions are being studied.

Since we started interviewing, unsolicited comments relative to the program have been received from employees which indicate their reception of the plan. The following are representative:

"I have heard the other operators who had been interviewed ahead of me talking about this plan of having someone come around and letting the operators tell about the way they get treated. I would never think of going up to the office with the things I've told you, because I know I would be found out and this way I know that the Company is going to find out how many people are dissatisfied and why. I have a hunch that this man I had so much to say about is getting cold feet already, because he just hates to see the operators who are not his friends get called up to be interviewed for fear that he will be talked about, and every time one of us does get called, he gives us a dirty look, as if to try and scare us."

"I think this idea of interviewing us is a mighty good thing. It should have been started years ago; you should come around often. The men do a lot of talking among themselves about what they think is right or wrong, and sometimes it gets back to the boss; then there is hell to pay. We need somebody like you to talk to about these things, so we won't have to kick to each other and get in bad by it."

"I believe the Company is doing more for the employees now then they ever did. This is the first time I ever heard of the Company sending men around to interview the help. They never took that much interest in them before."

"Say, I don't believe those interviews will do much good. They may, but that is just my idea of them. They will do with those interviews just what they do with a lot of suggestions the men turn in. It takes too long to get action on anything around here."

"I think it is mighty fine of the Company to send you fellows around to talk to us. It isn't very often that I get a chance to talk to a cultured gentleman like you."

"I feel much better since I have been talking to you. I thank you for being so kind to me. I wish you would stop and talk to me some time when you are in the department."

"The reason I told you all this is because I know the interviews are used for the supervisors' conferences and I hope they hear all I have told you."

"It is fine of the Company to send you fellows around to talk to us. I have been working here thirteen years and have seen and heard a lot. I always kept everything to myself. This is the first time in all the years I have been here that I have had a chance to tell the Company what is going on. I knew I would have the opportunity sooner or later."

"This is the first time that anyone ever interviewed the employees. It is a good idea because otherwise you would hold a grudge against your supervisor. It seems that if you tell your troubles to someone, it is easier to keep them out of your mind."

"I have noticed quite a change around here in the last three or four months. The bosses have changed their attitude. They are not so bossy as they used to be."

"It seems like since the interviewing program has been going on the bosses are coöperating with the help and mixing up with them, and I hope what I have told you will be of some help to the Company because I can see now that they are trying to get around and find out how the employees feel about things so that they can make improvements and make everybody more satisfied."

"The Foreman has changed down here within the last two months. He wouldn't listen to us or let us voice our opinions before, but now he is quite willing to listen to anything we have to say. I see him smile once in a while and this is rather unusual."

And one employee who was approached by the interviewer said, "I don't know about this interviewing, but I'll speak to my wife about it to-night and let you know in the morning."

CHANGES AND DEVELOPMENTS IN SUPERVISORY TRAINING

Since the inception of the supervisory training program in which the comments of employees were used as a basis for discussion, several modifications and changes have been made in this part of the plan. At first we used one or two complete interviews for discussion in each meeting. After ten or twelve meetings were held in this way, a very interesting result was noted. The supervisors were beginning to appreciate more fully what it meant to be a supervisor. They were beginning to find untapped sources of employee good-will, and to see how the worker felt about their supervisory methods. They were beginning to want greater knowledge and better tools than our previous supervisory training had offered in order to fit themselves into their job with its new perspective. We began to appreciate, too, the value of this enlarged supervisory picture; but we also began to see that something more than just the greater perspective was necessary.

With some studying of the situation and with the counsel of the supervisors, we changed the plan slightly. We took one topic for discussion in each conference and selected comments from several employees' interviews on that particular subject. These comments covered as many views of the subject as the interviews contained. Thus in a single conference we had various employee expressions on the subject and discussed it from the standpoint of the best supervisory practice. We are now in this phase of the program and expect it to last several years before all of the prospective subjects are covered.

We are beginning to look upon the problem of supervisory and executive training as a series of steps, in which the "rise" represents a fuller appreciation of the supervisory ideal and the "tread" represents the knowledge and technique required to adequately fit the supervisor to reach it.

It seems entirely possible that another phase of supervisory training may develop before the possibilities in the interviews are exhausted. While this phase is as yet only an idea and could not be done under our present plan, it would seem practicable at some future time to have a capable man analyze the supervisory comments coming from the employees under any one supervisor, and then discuss with the supervisor his technique and the manner in which it is received by his subordinates.

Another modification in the supervisory training program pertains to the manner in which the conferences are conducted. In the beginning the interviews to be used were studied and certain points selected for discussion. The conference leader then held the discussion to these points. At present, however, supervisors in conference are encouraged to discuss any points they wish. The conference leader, in addition to his regular duties, is expected by the group to be a source of information and data. His job is to be prepared to answer questions of fact relative to the discussion which cannot be supplied by the group members.

The following comments from supervisors are indicative of the interest and value in this form of training. While the favorable comments far out-number the unfavorable, several of the latter are included to show the point of view of the few supervisors who are not yet completely convinced of the plan's merits.

"I wish they had started this interviewing program when I was first made a Gang Boss as I sure am getting a lot of good out of the conferences. There are so many points brought out about supervision that I never thought of."

"I don't think I am getting very much out of the conferences so far. We had an interview last week that brought out a few arguments, but I have been waiting for some of the problems that I have had to deal with in my section. I have been fighting for one thing for a good many years and I know that the only reason that nothing has been done about it is because the Foreman has not taken it high enough. I would like to have them discuss this problem in a conference so that I could find out what some of the other fellows would do in a case of this kind."

"Gee, my supervisors sure are getting a kick out of these conferences. This morning one of the men came to me and asked if he could attend a second conference on the same subject because he enjoyed the first one so much that he felt sure he would get enough out of the second one to pay for his time."

"I really believe you are helping some of these hard-boiled Foremen and Gang Bosses. You know after they come back from a conference they start thinking it over and I believe it begins to soak in. They begin to realize what may happen in the future for your work is just new as yet."

"The training conferences are the bunk as far as I am concerned. They don't give us credit for knowing anything around here.

Why, it might be all right for a new Gang Boss, but I wouldn't say it was worth the time for our old Gang Bosses. Say, do you think the employees are telling you everything—far from it. There are many things that are brought up to the Foreman that we take care of and never say anything about, but no one ever gives us credit for it."

"I like the supervisors' conferences very much. You see, I am beginning to find out lots of things I was doing before which I know now were wrong. I did not do those things because I meant to, but I guess I just never thought about them. Now that some of these things have been called to my attention in the supervisors' conferences, I am sure doing things different."

"Did you go to the last conference we had? Say, they are getting to be good. You know, I am getting a lot of help from them. I am learning to see the operator's viewpoint of things, and I really believe I am learning to do my job much better by attending those conferences."

"The conferences have not helped me one bit. The interviews that we discussed have nothing to do with my job. I would like to see what some of the fellows in my gang think about me. I would recognize an interview from my gang in a minute. They all think that I am a son-of-a-gun here and the worst crab in the department is making the most money. I would like to know how some of the other Gang Bosses would handle the bunch of crabs that I have to deal with."

"Any supervisor that says he doesn't derive any benefit from the training school conferences in my estimation isn't worthy of his classification."

PROGRESS IN ANALYZING COMMENTS

Very few changes in the method of analyzing employee comments have been made since the work was started. With the Inspection Organization comments, only those that were unfavorable were sorted out for study. Experience in studying these indicated that favorable comments should be studied simultaneously with the unfavorable if the causes of the latter were to be properly identified. This is now being done and studies are being made to determine the best methods of securing all that is valuable from the interviews.

Many improvements and adjustments of plant conditions have already been made as a result of investigations initiated by this plan. The employees' comments with respect to minor changes indicate that they attach considerable importance to conditions which we hitherto thought to be of little significance. Investigation work is going forward rapidly, and as the program develops, we expect the adjustments made to improve employee relations still further.

CONCLUSIONS

We may, in conclusion, summarize the values in this plan. It must be realized, of course, that it is still in the early stages of development and as yet all the values are not definitely determinable.

First, the interviewing of employees has had very desirable effects upon the employees themselves. Those interviewed have had a chance to fully express themselves and clear their minds of burdensome thoughts. As evidence of this, supervisors have sometimes commented that such employees are easier to supervise; and employees themselves have said they felt better after such a hearing as the interview affords. In addition, there is the probability that interviewing improves an employee's morale because he is reassured that the management wants to better his surroundings, and he feels that he is important enough to have his opinions sought.

Second, the Company receives information and data from employees which has not otherwise been received and which serves as a basis for studying employee relations and for improving plant conditions. In addition, we are getting first hand information as to the effect which all of our personnel activities, such as the thrift plans, pension and sick benefit plans, athletic activities, and vacations, have upon employees. This in itself is invaluable.

Third, the very operation of the plan makes for improved supervision. Many employees have remarked that supervision improved after interviewing was begun. It seems only natural that a supervisor who knows that his employees are going to express their favorable and unfavorable thoughts will give more attention to his method of dealing with them.

Fourth, the supervisory training made possible through the comments of employees is far superior to any of our previous programs. It is most interesting to supervisors because the employee's comments are critically made and, for all the supervisor knows, he may be the subject of the employee's remarks. It has never before been possible for our employees to criticize their supervisors so freely without fear. Under this plan they may not only speak freely, but their opinions benefit their own and other supervisors as well. Most of the supervisors are enthusiastic because they see considerable value in this phase of their training. Such an indirect method of getting employees' complaints back to the supervisor is far superior in its results to the old method of direct accusation and argument.

Finally, the comments from employees have convinced us that the relationship between first line supervisors and the individual workman is of more importance in determining the attitude, morale, general happiness, and efficiency of that employee than any other single factor. We believe we have progressed further in knowledge of employee relations during the short time this plan has been in operation than in all the previous years of the Company's existence.

Changing Methods in Industry

By Elton Mayo, *Harvard Graduate School of Business Administration*

Professor Mayo has been closely associated with the investigations at the Hawthorne Works of the Western Electric Company, described in the earlier pages of this Journal. He here points out the broad significance, for management and for society, of the changing ideas of control there exemplified.

The Western Electric investigation is symptomatic of at least two changes in the relation between industry and the community. The first is of the nature of a new relation between industry and human research. Previously applications of psychology and physiology to industry have too often consisted in essentially trivial tricks and shifts, while here the interest has been wider and far more inclusive. The second change is in the conception of human control. Out of the original study there grew a keen realization of the advantage of supervision that "listens" rather than gives futile orders; that gains understanding of individual workers and thus is able to aid and guide them to develop self-control and personal efficiency. The passing of the yelling, order-giving supervisor is presaged.

THE two papers to which you have listened today, the description by Mr. G. A. Pennock and Mr. M. L. Putnam of two years' inquiry in the works of the Western Electric Company, have professed to be little more than a matter of fact account of the course run by investigations that begin with one group of questions and continue with another. I think it would be a mistake for us to accept so modest a description of these highly significant events. It seems that in two respects at least these inquiries are symptomatic of the approach of changes, perhaps long overdue, in the relation between industry and the community. It is to these two changes that I wish to call your attention for a few brief moments before the session ends.

The first change is in the implied relation between industrial organization and biological or human inquiry. We have heard much before now of the application of physiology or psychology to industry. It has nevertheless been true, but for the rarest exceptions, that no industry has committed itself to profound meditation upon the significance of biological or social discoveries, or to the basing of its industrial policies upon such knowledge. Industry has tended rather to look to these studies for essentially trivial tricks and shifts—ingenious devices that should bring an immediate recompense. Rags and tatters of physiology and psychology coupled with oddments of technique have been expected to yield increased production or diminished labor turn-over or some other rather obvious justification of the so-called experiment. Now although the Western Electric Company, as you know, has already secured many such heartening results—and one is glad of it—these results have never been the end or intention of the inquiry, they have been secured by the way. The intention of the inquiry from the beginning has been the advancement of our understanding of human situations, the development of a more precise and biological knowledge of what is happening in industry, knowledge of the general conditions that affect human capacity for work. As a result of this wider interest, there has been a singular freedom from the blindness consequent on trivial satisfactions. At a time when several of the older universities are considering the development of collaborate effort in human inquiry, the Western Electric Company has given us all a lead.

The inquiry begins in the failure of a carefully arranged and carefully controlled experiment. Mr. Pennock and his associates conclude that, although physics and chemistry can proceed to experiment by the selection of two or three variables, human investigations cannot be so conducted, except in inquiries involving physical or chemical analysis, without incurring serious danger of distortion or falsification. The apparent implication of the illumination experiment is repudiated not because it is repugnant to common sense but rather because the carefully established control has obviously failed to account for the really significant factors that have determined the result. So when the second series of experiments, those reported here today, is begun, an opposite form of procedure is adopted. A group of workers is segregated for observation of the effect of changed conditions of work, but no attempt is made to "test for the effect of single variables." Where human beings are concerned one cannot change one condition without changing others—so much the illumination experiment has shown. So Mr. Pennock and his associates attempt to observe the unanticipated changes in working conditions as well as those which have been designed; and they attempt also to observe the consequent changes in the workers. In order to do this effectively they devise methods of measuring or, at least, noting carefully *organic changes, changes in production, and changes of mental attitude.* The most important of the organic measurements is probably the periodic medical examination, although direct methods of measuring the organic effort required by the job are applied with some success. Changes in production are measured not because they are in themselves important but because they afford direct evidence of the worker's capacity to sustain interest in her work under varying conditions. Changes of mental attitude are observed by the introduction of a new method of supervision—a method which does away with personal criticism and the giving of orders, and substitutes for these a sympathetic and careful technique of listening.

The results are interesting from the first moment. For example, it speedily becomes evident that the new method of supervision, introduced in order to gain evidence of change, is itself one of the most important changes introduced. You have been told that the interviewing program grew out of the original test-room experiment; it was actually in the first few weeks of segregation of the group that it thus emerged. Furthermore, the method of observing the changes that occur in workers by the day, week, month and year, and the relation of these changes to other factors in the individual or group situation—this method tends to dispose, and summarily, of the idea of "types" of workers, "good" and "bad" workers and so on. An instance has been quoted to you, out of the many instances that have been found. If the worker known as number five in the mica group had been critically considered as eligible for inclusion early in the experiment, she would have inevitably been discarded as a "bad" worker. Her production is low and irregular. She makes many mistakes. She is, however, continuously interviewed after the first few weeks—and welcomes it. She is thus nerved to made decisions with respect to her private situation and to carry them into effect. And her production increases and steadies to such an extent that she bids fair to become the best performer.

In addition to this, the experimenting group soon finds that it cannot accept or use the usual industrial conception of fatigue. Industry still tends to think of fatigue as essentially the same ill in all instances, and consequently as susceptible to the same type of remedy. A recently published text book in the economics of industry begins its discussion of fatigue thus: "Fatigue is physiological and the result of a toxin in the blood which is produced by continuous physical or mental exertion. Rest and change are imperative in order to permit nature to do the work of recuperation by rebuilding the worn-out cell tissue." It is difficult to know where justification can be found for such a generalization. Our colleagues of the Harvard Fatigue Laboratory have given much time to study of the changes which occur in the blood stream as a consequence of muscular exertion ("Studies in Muscular Activity," *Journal of Physiology*, Vol. LXVI, No. 2, A. V. Bock, D. B. Dill and others). They find that the general difference between a Marathon runner and others is that the Marathon runner can achieve a "steady state" while running—his blood stream shows little or no change in chemical constitution—whereas those others who cannot continue running show an increase of lactic acid, a diminution of alkali reserve and "oxygen debt." More recent studies (*Journal of Bio-Chemistry*, D. B. Dill, J. H. Talbott, H. T. Edwards) show other changes in the chemistry of the blood during exercise; these other changes, however, do not seem to bear the same general relation to capacity to continue muscular exertion as those specified above. But nowhere is there any evidence that the "work" we have examined in factory situations involves "oxygen debt;" nor is there any evidence that "continuous mental exertion" gives rise to this disability. The hypothesis, or question, that we have taken from the work of Dr. L. J. Henderson and his associates of the Fatigue Laboratory for industrial use may be conveniently expressed in the form of an assertion than an individual cannot continue work, or production, unless he can simultaneously work and maintain himself in a condition of organic equilibrium. Dr. W. B. Cannon's recently published paper (*Physiological Reviews*, Vol. 9, No. 3) on homeostasis,—the balance between exterofective and interofective factors,—supports this view. Since one finds few instances of actual "oxygen debt" fatigue in factories and since this is no more than a particular instance of unbalance, one must look for other sources of disequilibrium, such as interference of any kind with the individual's capacity to attend to what he is doing. In a recently published paper in the *Journal of Psychiatry* (Vol. IX, No. 1) two writers report that application of a method elaborated by Professor Knight Dunlap to investigation of psychotic individuals showed them to be deficient in range of attention and power to sustain attention as compared with normal persons. Put in other words, disequilibrium may show itself at any given moment in the form of an incapacity to sustain attention. This symptom seems to be diagnostic, not only for purposes of the comparison made above, but also for industrial situations where the cause of disequilibrium may be in the external conditions rather than in the individual himself.

Something of this emerged early in the Western Electric experiment. The idea of fatigue, in its popular sense, disappeared, leaving in its place the realization of a need in industrial situations to be very alert to the presence of interference, of many types and kinds. This led directly to the realization that there may be as many varieties of disequilibrium as there are individuals. Health and personal history, the social situation outside the plant and in the working department—these considerations of established relevance, all indicated the wisdom of an interviewing plan, if rightly conceived and practised. It was not thought that the workers themselves would be able to specify rightly the particular interference or disability. But experience had shown that if the individual were encouraged to talk freely, and under the protection of a careful anonymity, the effect was not merely personal and emotional relief, but also, in many instances, the revelation to the critical observer of the locus of "interference."

I have said that the first change resulting from or foreshadowed by the inquiry of the Western Electric Company is of the nature of a new relation between industry and biological and human research. I hope that my comments have sufficed to make clear how closely at least one industry is approximating its point of view and its methods to those of the universities.

The second change to which I wish to call your attention is the changed conception of human control which is not only a logical but also an actual consequence of the inquiry. Mr. Putnam's paper has shown you that the history of this latter development resembles in many particulars the history of the test-room experiment.

In this instance also the inquiry begins with one intention and continues with another. The original idea, at least in part, was to learn more of the actual situation in various departments, to discover differences in quality of the supervision. As the plan developed, more interest was taken in the individual himself, his situation and the consequent distortions in his thinking. And the whole conception of what constitutes good supervision has radically changed.

The Western Electric Company plan differs in several respects from any other industrial use of the interview. In the first place, the identity of the person interviewed is known only to the interviewer; and this anonymity is most carefully protected. The protection is not only direct, but also indirect. That is to say, every interview is carefully gone over by members of the department and all clues of a personal order that might lead to identification are suppressed. In certain instances, this may even diminish the value of the interview, but it is nevertheless carried into effect. In addition to this, no interview is released for use by the supervisory training department, until a sufficient number of interviews from various quarters have been collected for general release. Partly, but not wholly, because of this, the workers have come to have great confidence in the plan, they realize that their confidence cannot be abused, and the general quality of the interviews has been high.

Another difference in the Western Electric Company plan is that the interviewers are taken from the employees of the Company. They are individuals of sufficiently mature experience, of intelligence, and already in line for promotion to supervisory positions. This procedure has many advantages—they do not, for instance, come to the interview as outsiders, they need no elaborate explanation of Company policies and situations, they can accept and interpret statements without need of laborious explanation. In all these matters they have their own knowledge and experience to guide them. But these things, however important, are yet minor advantages. The really important change is, I believe, that the Company is developing a group of future supervisors who know the technique of interviewing and of human control, who have realized the importance of fact-finding in personal situations, and who are able to extrude emotion or moralistic admonition from their personal contacts. The interviewers as a group are eagerly aware of the importance of their new method of fact-finding; but their eagerness is intelligent and their technique of interviewing has in the last year developed amazingly. They have learned to listen rather than to talk, to develop new capacities for active listening. And one has to remember that they are future supervisors.

It is perhaps to this that the surprisingly unanimous verdict of the workers is due. "This is the best thing the Company has ever done," "The Company ought to have done this long ago": these seem to be the typical comments. It is interesting that one individual who describes himself as a "suspected Bolshevik" is as enthusiastic as his fellows; the only addition he makes is the suggestion that perhaps the plan has been inspired by a "radical" newspaper. It is interesting also that employees report improvement in the supervisors and that almost simultaneously the supervisors report that the employees are "easier to handle."

So much you have already learned from Mr. Putnam's paper and from Mr. Pennock. And now, having used such dangerous words as "eager" and "enthusiastic," I have to ask an entirely sober question as to what is happening. While this question cannot be wholly or even satisfactorily answered, I think that it is nevertheless possible to indicate something of the change that is in progress. Certain future supervisors are being trained to a new method of human understanding; the material they gather is being made available for the training of all supervisors. What is this new method of human understanding?

It is essentially another development of that principle of accurate fact-finding as the basis of thought and action that has been humanity's most reliable guide in recent times. Both the test-room experiment and the interviews have shown the importance for morale of first line supervision—the supervision nearest to the worker. And it must be confessed that up to the present the quality of first line supervision that civilization has provided for industry has never been very high. The fact that one man has been set in control of others has usually been taken to imply that he is expected to give orders and to have them obeyed. So supervision has frequently come to mean "ordering people about." There is only one objection to this, and the objection is not in any sense political, it is simply that the method is exceedingly stupid. If there is difficulty or delay in obedience, or eccentricity, or "slackness," the supervisor is expected to yell and bawl and swear or, what is even worse, to indulge in lengthy admonition. So he "talks" and does not "listen"; and he never learns what is really wrong. The workers are often terrified, they harbour a grievance and at last, if they express it, they tend to overstate or to distort. At once the overstatement is seized for attack, and the possibility of understanding is lost.

Perhaps in this, I am myself indulging in overstatement. But at least I can claim that where the good supervisor listens and becomes acquainted with personal eccentricities of attitude —and the causes of such eccentricity —the usual supervisor does not; he prefers to talk and to give futile orders. The interviewers of the Western Electric Company have discovered that it is really true that one can understand personal eccentricities and disabilities by sufficient listening, that one can help the individual to diminish his disability, and to develop self-control and understanding. And the Western Electric Company has discovered that it can train good supervisors and need not endure bad ones.

Now if industry, by reason of fact-finding and intelligent policy, is going to give up ordering humanity about, and to help it to self-control and social understanding, this would seem to be an industrial change of major significance both for industry and for society.

This would indeed seem to promise some humane complement of the changes which the industrial revolution and political democracy began.

In saying this, there is no doubt that I anticipate and, perhaps, too considerably. But a definition of direction and of possibility will never minimize in any rigorous inquirer his realization of the immense amount of work demanded before such results can be achieved.

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Addresses at the Dinner Meeting

Three speakers made the dinner meeting of the Personnel Research Federation November 15th a memorable occasion: Mr. Stuart Chase, author of "Men and Machines"; the Honorable Frances Perkins, head of the New York State Department of Labor; and Professor John Dewey, revered philosopher and friend of men. All spoke without notes, but the stenotypist has reproduced for us at least the gist of their addresses.

Fatigue, Morale and Output

By Stuart Chase, *Labor Bureau, Incorporated*

I MUST come to you this evening as a layman, not with the charts and graphs of a specific piece of research, such as you listened to this morning, but rather with the observations—and with apologies to Dr. Dewey—the observations of a journeyman philosopher as to this question of fatigue in industry. I would like to come to you with a specific research document in my pocket dealing with the fatigue in Wall Street since October 24th, not so much the fatigue of the margineers as of the clerks. I think there is a very interesting study for somebody to make of the way the clerical forces in Wall Street have been working since the crash, and how they have worked.

"Whither Mankind" started me, I suppose, as a sort of a spring-board into these larger problems of what specifically the billion horses, more or less wild in the modern world to-day, are doing to us; and no more had I got started in this inquiry than I was faced with the specific problem, among others, of the robot, the flesh-and-blood automaton. Are we turning as a race into robots, automatons, half-men, dominated and undone, our souls destroyed by these wild horses?

The first thing that I chose to find out in this particular problem was how many robots there were in the United States of America. I took the 1920 census of occupations, and tried to find out how many persons were confronting the machine throughout eight hours of their daily labors; and I discovered that something over ten million, about one-quarter of the gainfully employed, were in actual confrontation.

Then I began to carry the analysis a little deeper. Are those ten million necessarily dominated? Are they slaves to mechanization? Obviously and immediately it appeared that great sections of them were not slaves.

Is Lindbergh a slave? Yet he is a machine tender. All of us who drive automobiles know the exhilaration we receive from piloting a powerful engine across country roads. The same way in the factory. There are many jobs where the machine tender is not dominated by the rhythm of his mechanism, but where he uses the mechanism and lets something of its vigor and vitality into his own veins.

There are workers in a jewelry establishment in Newburyport, for instance. They use machines, yes, but they use them only to make their handwork more delicate, because a machine can hammer a plate surface more finely than can a human hand. So I revised my figures, trying to find out the number of robots in the country who were dominated by the machine, and it came down to something over five million, which in 1920 was about 5 per cent of the population.

Now that is a rather low ratio to form the basis for a conclusion that we are being turned into slaves of the machine. Furthermore, that ratio is dropping. As the automatic and semiautomatic gains ground in industry, and it is gaining ground all the time, machine-tenders give way to skilled planners, inspectors and dial watchers. In the new oil-burning liner, California, three white-garbed firemen, watching dials and throwing switches, have replaced 120 stokers. That sort of thing is going on throughout the industrial structure. I suspect that to-day the ratio of robots is 4 per cent, but still, lest we grow over-optimistic, four or five million men and women in chains, dominated by the machine, dominated by monotonous repetitive jobs, is a ghastly total and presents a tremendous problem.

Let us carry the analysis further. Dr. Myers finds that in monotonous and repetitive work there are three classes of workers. There are, first of all, those with a low intelligence quotient, who apparently do not object to monotony, if the speed is not geared too high, who day-dream as they work. My friend, Fred Colvin, one of the editors of the *American Machinist*, tells the story of being very much perturbed by this question of monotony in industry, and of going out to one of the big automobile establishments and telling the managing staff, "Here, you ought to shift your jobs. You shouldn't keep these people working at this same repetitive work; it should be changed around." Under the belt-line was a gentleman lying on his back on a cradle that moved in and out of the assembly line. He had fixed up a cushion for himself to lie on, and as the frames of the cars came by overhead he reached up and screwed on a bolt or something of the sort. They suggested that this gentleman should be transferred to another job. He crawled out from under the assembly-line very, very mad and said, "Change my job? Well, I guess not. I'll quit if you change my job. I've got the softest job in the shop; nothing to do but lie down all day." He belonged to Class 1, and a great many of our fellow-citizens belong to Class 1.

Secondly, there are those who object to monotonous work but who compensate by outside activities, and, of course, that is where the whole question of play and recreation enters. It becomes cardinal in industry to give a proper balance to jobs that will inevitably remain monotonous, no matter how fast the automatizing process goes.

Thirdly, there are those who are injured by monotonous work and who can find no outlet or compensation; and that, my friends, is the tragic exhibit.

To illustrate: Here is a group of intelligent girls who were put on a monotonous cross-stitching job. They learned their work quickly. In a short time their output exceeded the duller girls' who normally did the work, but in three or four weeks the output curve fell until the intelligent girls were turning out far less than the others. Why? Because they were slowly being bored to death. They could not stand the monotony of it. In other words, we are faced with a problem of selecting workers of the proper type for our industrial processes, and, other things being equal, it is necessary to select them presumably in such a way that industry itself will not be unduly handicapped by the process.

Here I want to make a personal confession. I called myself a journeyman philosopher, and as such I am not a business man. I am not interested in corporate profits except academically. I am interested in men and women and the reactions of the modern world on men and women. I would rather have a poor state with happy people in it than a rich state with millions in misery, psychological or otherwise. But it happens that there may be a compromise between these two points of view on this particular problem. We have been finding compromises lately, strangely enough.

Take the doctrine of the economy of high wages. Enlightened business men in America to-day, particularly in the larger establishments, are announcing at such banquets as this—and I believe also in their own hearts—that wages should be high, in order to promote that flow of purchasing power which will keep mass-production functioning with a minimum overhead cost. Now that is a doctrine to make Adam Smith and the Manchester School turn in their graves. It has always been held that the lower the wages the lower the costs and the bigger the profits; but under this new doctrine apparently it is not true.

Another compromise is found in the Safety First movement. It costs money, lots of money, to introduce the necessary devices needed for adequate safety for industrial employees; but it has been found that that money in the end is well spent. The Engineering Council finds that in those plants where output is at a maximum, accidents tend to be at a minimum. In other words, it pays in dollars and cents to reduce industrial accidents.

Why can we not carry over that same compromise into this question of monotony and fatigue? I think we can. In fact, I think that it is already beginning to be done. The whole movement toward shorter hours and the five-day week is in line with such an assumption. Careful studies have proved that in specific industries and trades, output is as great on an 8-hour day as it used to be on a 12, and sometimes greater.

Now in the specific problem of fatigue and the toxins which it sets up, the Industrial Fatigue Research Board in England—to give a typical example of the sort of studies that are being made—puts counters on the looms in the weaving sheds, and meters on the motors for measuring power-consumption. Undoubtedly you know more about these studies than I do. They have found that on Tuesday morning between 8 and 10 o'clock output is at a maximum, and that on Friday evening at 5 o'clock output is at a minimum, with a variation between the two of some 12 per cent. It finds the daily and the weekly output in a fatigue cycle. Then it starts to find out the reasons, and it appears that the reason in this particular case seems to be temperature. That is, as the machines get under way, the weaving sheds warm up. They not only warm up during the day and cool down in the evening, but they warm up cumulatively throughout the week. By adjusting the temperature, output is increased, and the men and women in this particular job are made more comfortable and more healthy. The two points of view have been coördinated, brought together, unified.

As such studies are made the remedies may take account of all sorts of variations. It may be temperature, it may be ventilation, it may be the speed of the machinery, it may be the specific motions of the workers themselves.

Mr. Walter Polokov, the distinguished mechanical engineer, has made fatigue-studies here, using as a quantitative measure, carbon dioxide expelled by the lungs. He has worked on compositors on the night shift and measured the carbon dioxide they give out, and has charted very pretty curves.

Professor Kitson, of Columbia, has worked out a study in the measurement of work-interests, a scale which he proposes to apply and has already applied to certain trades and occupations.

The National Institute of Industrial Psychology in England has served over a hundred clients. It is not a humanitarian organization; it is an organization in business for income for professional workers, and it finds that lessening fatigue pays for its services and pays the organization which has the work done in its shops.

Mr. Ordway Tead, whom I see in the audience to-night, has blocked out a very interesting and significant approach to such studies as I am referring to here, particularly in the field of the psychology of the worker, that is, throughout the industrial world. These studies are being made now and my plea is for more and more of them.

I am not interested, as I said before, primarily because there is profit in it. I think such studies will pay for themselves; but my main interest is that they will serve, when we get a sufficient body of accredited research opinion, to meet this challenge of the machine, the accusation that it is wrecking the bodies and the minds of our industrial workers. If we can point in shop after shop to the careful work that has been carried out, to the actual health statistics, physical and mental, of the employees therein, that challenge and that accusation will break down.

Enter the next ten factories that you pass and ask the manager if he uses fatigue-curves. He will think that you came directly from the nearest speakeasy. Not until you reach the ninth will you see them actually upon the walls; but if they mean lower costs, bigger margins in the competitive struggle, they are bound to come, just as automatic machinery and mass production have come. They open limitless possibilities for keeping the bodily mechanism of the worker at par, the bodily and the mental. And his soul, —I wonder how long it is necessary to lie awake worrying about a healthy man's soul!

Psychology and Work

By John Dewey, *Columbia University*

I don't know exactly on what grounds I agreed to speak on my announced subject of "Psychology and Work," and still less do I know on what grounds I was asked to speak on it, for I am not a psychologist; and as for work I have always had great sympathy with a colleague who, when a department of social work was introduced into the University, said he thought it was a very bad precedent to associate the title "Work" with a university department.

However, it occurred to me that the title "Psychology and Work" had two poles, and that the subject might be approached from either one, with the emphasis upon either of the terms, psychology or work. I thought first of speaking about the problem presented to us by work, but I have always been perplexed and challenged by the very wide range, the great scale of different activities to which the name "work" can be given. It means everything,—the voluntary, joyful expenditure of energy, using the whole heart and mind of people like artists, scientific investigators and many professional men; and it means also what we call labor, where the element of pain, sacrifice, what the economist calls "cost," is marked, and yet, on the whole, the activity seems worth while. Then it also means those monotonous, mechanical, perfunctory activities that we call toil, drudgery, which people engage in not at all because they want to, but simply because of some external pressure. So I say it has always seemed to me that there is an extremely interesting problem involved in this very wide range that goes, all of it, by the name of work with different adjectives prefixed. But as I thought about that angle of the subject, I realized that that topic led very far into all kinds of social, economic and even political problems. It was not suitable for an occasion like this, nor a topic on which I was at all competent to speak.

Before, however, approaching it from the other side, there did occur to me a certain consideration associated with a visit to Russia. Although I had no adequate experience and can not speak at all as an expert, anyone who came in contact with what we would call the laboring-class there, could hardly avoid being impressed by the pride and satisfaction with which workers referred to "our" factory. I can not but think that there is a very interesting problem here for psychological investigation regarding the incentives that lead people to engage effectively in labor. I do not mean by that merely the participation of the workers in the management of shops and factories. I am of the opinion that there are places in other countries where shop-committees function quite as well and perhaps better than in Russia. But there is another phase of the situation there which psychologically I think is unique. That is, there is the state Industrial Plan which covers or attempts to cover a general plan for the development of industry for periods of five years ahead. Those plans are made of course, by economists and technologists, engineers and industrialists working together; but the interesting part of the situation is that managers of factories and laborers in factories are taken into some intellectual partnership. They know what the plans and purposes and the system of the Central Planning Committee of the State are; and they get a sense of being partners and fellow-workers in the development of these large plans that coördinate the growth of industry over the whole country.

I have wondered whether there were not in that fact certain suggestions which are quite independent of any general social scheme of communism of capitalism. Is there not a psychological factor involved, that of modifying the attitudes of workers by making them feel that they have some participating share in a large scheme of development.'

However, it is to the other pole of the subject that I am turning. Psychology in those days long ago when I might have made some claim to being a psychologist, was almost entirely a study of certain intellectual functions, or powers of knowing. In consequence it was concerned almost exclusively with those functions where the mind, consciousness, or whatever we may call it, had contact and relation with objects, with things, rather than with other persons, very largely to the subordination of all the emotional and active factors that come in when individuals are in relation to each other,—relations of personal contact, intercourse, intercommunication, association, and so on.

When experimental psychology began, it at first took over that same interest. It was very largely an analysis, under more careful conditions, of the reactions of sensation, perception, memory and so on, a coördination of movements connected with these more definitely intellectual functions.

Naturally, when industrial psychology began to be of interest, I take it that it also largely started from the same standpoint for very good reasons. In the first place, because the psychologist had the best training and the greatest expertness in that field, and secondly, because the more obvious interests of employers and managers had to do, or seemed to have to do, with the relation of workers to things, —adjustments to the machines, tools, or products of work that they made, through their sense organs and their muscular coördinations. So it became chiefly a study of what, I suppose, one might call technical efficiency, that is, efficiency as judged from the standpoint of the material output, rather than a study of that larger human efficiency to which we give the somewhat vague name, morale.

However, there was going on independently a consideration of the psychology of human relationships, social psychology, as over against this psychology of the relation of mind to things and objects. In a somewhat striking and unexpected way the development of psychiatry reinforced this tendency because it showed how many of the abnormal idiosyncrasies and disabilities that affect human nature had their origin in social maladjustments, going back sometimes to early family life, or, perhaps, to present marital relations. I take it that contemporaneously with this development in academic psychology and in psychiatry there has come the tendency in industrial psychology to attach greater importance to those phases of the workings of mind and personality that have to do with human adjustments, with the relationships which individuals sustain, in their life and in their work, to one another.

I was very kindly shown by Dr. Bingham some of the recent reports in manuscript, and I was especially struck by the Hawthorne investigation, about which many of you here know much more than I do, to see how much importance was attached as the result of that investigation to the establishing of better human relationships, and how, according to some of the findings at least, such relationships seemed to be more important factors in controlling even the efficiency of material and technical production than did the more specialized technical factors themselves. I was also impressed by what I think can fairly be interpreted,—although, perhaps, these exact words were not used,—as a recognition of the desire of every individual for some acknowledgment of himself, of his personality, on the part of others. It often seems to me that that is the deepest urge of every human being, to feel that he does count for something with other human beings and receives a recognition from them as counting for something. I take it that our sense of our own personality is largely a looking-glass phenomenon. It is a reflex thing. We form our ideas, our estimates of ourselves and of our self-respect in terms of what others think of us, in terms of the way in which they treat us. At all events, this was an angle of that investigation which appealed especially to me: the changed response, the changed attitude even toward technical problems of production, that came about when individuals found that their opinions were regarded as being worth asking for, that they were really worth consulting in the conduct and management of the affairs of the factory.

That is only one illustration, but it seems to me a very fundamental one, of what I mean by the shift from mere technical efficiency to that larger human efficiency of the whole self, the whole personality, involving these factors of social adjustment.

There is just one other factor of this larger human efficiency that cannot escape, at least, mention, and that is the rôle of thought or understanding, a recognition of the meaning and the significance of the activities that constitute work and labor. I take it that the difference between the activity of the machine and the human robots, of which Mr. Stuart Chase spoke, and a really intelligent being is that the latter has some sense of the meaning of what he is doing. When he enjoys his work, it is partly because of his recognition of its significance. That again is a problem on which, as you all know, considerable work has been done. The problem is evidently most difficult in connection with industries where the mere assembling of parts that are ready made,—nothing to do but go through certain motions of assemblage,—is most prominent. This problem is obviously to a considerable extent a technological one, that of extending still further these inventions of which Mr. Chase also spoke, so that work will more and more be done by real machines instead of by human ones. But it seems to me that there is a problem, at least of degree, in all of these cases; that there is at least a possibility of increasing on the part of every worker his sense of the meaning of the activities that he is carrying on, so that more of his own ideas, thinking, will go into it.

This phase of the matter of course, is not identical with the problem of human and social relationships, and yet it is not wholly independent of it. It might be an agreeable change if I read part of a letter that I received during the past week from a working-man in a Connecticut factory, a man who told me that he had had simply a grammar school education. He is a worker at a machine in a factory who has, on his own account, apparently with no special encouragement from above, taken to reading psychology in order himself to put more of meaning into his own work. He says:

> "When I have a thought on a subject I am so constituted that I have got to tell that idea to someone.
>
> "For instance I am at work on a machine and an idea comes to me of an improvement on the method of doing the work. I cannot keep it to myself and I have no satisfaction or rest until I tell it to the boss in hopes that he will see the idea the same as I do and do away with the old method. If he cannot see it as I do and does not explain why he does not, I am disappointed but it does not last long for just as soon as a new problem arises it is the same thing over again. When an idea is accepted and used I have great satisfaction even if I do not get a raise in pay although that would also be very satisfactory but the last is not the greatest.
>
> "Other men say why do you tell him, he will only use it for his own benefit and I know what they say is true but still I feel the idea is dead if I do not speak and perhaps it may be of great value so I keep on, perhaps with the selfish thought, that some day I will meet a man who will say, there is the kind of a man I am looking for, and from time to time, I have returns for ideas but only when I was able to go to the head of the concern. Now in most shops, the ordinary workman cannot get in touch with the head of the concern, as he, the head's time is taken up with problems requiring thought that cannot be interfered with by minor details of the business still these details are vital to the whole.
>
> "Concerns say we know of such things and that is why we have under officials to look after these details, yes, but do these officials always handle these problems, with an unselfish end in view, do they never advance an idea as being original when it really came from someone else who gets no credit, and from one who works with the thought that the concern is his as much as it is yours for through it he gains his living and through that is able to educate himself to meet new problems as they come and they will always arise for they the new problems cause others

to arise so we should endeavor to make the present as near perfect as we can in order to make the future which in time will become the present, perfect. By this time you are saying I know all about that stuff, but I am a business man and have got to produce, I can't see every sweeper in the factory and listen to his idea of what he thinks is the best way to run the concern.

"Very true, but you could have a real working Personnel Dept. that the men could go to, in order to express their thoughts and just as freely as they do to one another, whatever ideas given would be taken by the Personnel Dept. with the understanding that the great desire of the company is coöperation, it being especially understood that the official in charge shall receive no personal benefit from suggestions but shall use his best endeavors to see that the ideas be given a hearing. For through that method the Mental attitude of the men will be changed from passive resistance to the feeling that the company has at all times the interest of the men at heart and our mental altitude control our actions.

"This Dept. cannot be run by a person with the mentality of a $10.00 a week clerk as it is the most vital in the whole organization."

And then he ends by saying:

"It can only be run by an honest man, and a man is never honest until he thinks."

That's a very much better speech than I could have made on my own account. It came to me quite unsolicited from this worker with, as I say, simply an ordinary grammar-school education, but who has evidently got a mind,—I do not need to certify to that,—and who wants to give his mind play and outlet on the work that he is doing. Of course, he is an unusually superior type; but I don't think until these investigations along the lines already started are carried further, that we shall know just how many real minds there are. In all events, these two sentences, about his urge to communicate his ideas, and his concluding sentence that nobody can be really honest unless he thinks, seemed to me to indicate in a concrete way what is meant by saying that there is a real connection between social adjustments and relations and the intellectual powers and qualities that enter into work.

Government's Share in the Solution of Modern Work Problems

By Frances Perkins, *New York State Labor Department*

The principal duty of government, and of a government department segregated for the purpose of representing the interests of labor in our civic life would seem to be to make itself into a sort of Bureau of Standards for human factors in industry. The Bureau of Standards at Washington, D. C., serves a valuable purpose with reference to material and machines. Labor departments and industrial departments should have a similar purpose for the men and women in industry. That is, it is our duty to set up certain minimum standards of decency in the treatment of men and women in industry, and having set up those minimum standards to proceed to enforce them.

Now that is not interesting to people

who are speculating in the higher reaches of this science but it is vastly important to the people way down the line who are going to go into industry when they are 14 or 15 and work up step by step, trying to get not only their wages but their life, their pleasure and their education, Dr. Dewey, as they go along in our industrial life of to-day.

So that is our first duty—to set up and enforce certain minimum standards of decency.

When I read the letter that was published in the *New Republic* a few weeks ago from somebody who worked in a North Caroline mill, who described the horrible water they had to drink in the mill, how it was brought in from a polluted stream in a bucket and the bucket was put in some dirty outhouse, and not even the proper provision of separate drinking cups made, I suddenly realized what was the meaning of the old law which we have on the statute books in the State of New York and which I had often smiled over and thought, "Isn't it ridiculous to have written in a law that an employer must provide clean and pure drinking water for employees." But just that difference between a government which does set up a minimum standard and require its enforcement and a government which does not set up a minimum standard of decency is illustrated in a situation such as exists in North Carolina, which has shocked all of us in its disregard of fundamental human necessities.

The second duty of government, as I see it, in our industrial life to-day, is to furnish a favorable soil and a favorable background for the development of such experiments as are being made by the industries and by the minds which are represented in this organization, that is, experiments in the improvement of technique in industry, experiments in improvement of personnel management, in the management of people as people in relation to their work, and improvements in the technique and methods of relationships between the two great economic partners of this enterprise, workers and employers.

Government cannot, I think, ever take the lead in the development of these new experiments. Government, representing the public in the great mass as it does, cannot afford to make the experiments, cannot afford to take the chances and make the discards which are necessary in any laboratory in experimental work. Government will follow behind, but government must furnish a soil favorable to the development of such enterprises. This we do under the system in effect in New York, Wisconsin and Pennsylvania, where, by the use of the administrative-order method of developing our labor law, we are able, after we have sufficient knowledge, to require certain new proposals to become the law of the land without bringing a bill before the Legislature. Merely by administrative order, properly adopted after public hearings and discussion, we are able to require of all industries certain new standards based upon new experiments. By the wise and intelligent use of that power, I believe that government can and does furnish a stimulus to the invention and development of better and more humane techniques of industrial management.

Take just one example. The question of the regulation of spray painting has been before our Labor Department and I think before all the Labor Departments of the country for some time. I do not know whether you all realize the extent to which the introduction of the spray brush into the painting industry has added a new health hazard for those who are exposed to the poisons which are often in paint and various lacquers. Lead and benzol are the two things which paint workers particularly have to look out for in guarding their health. The use of the spray method of painting, which is a quick, economic and effective method of laying paint onto solid material, has added hazards, by the distribution of those particles into the air and the possibility of absorption into the nose and through the mouth-passages, which are much greater than the hazards involved in the old method of laying paint on with a brush. It is a very difficult thing to know how to handle this problem, because it is a cheaper, quicker, and, perhaps, a better method of laying on paint. The regulations of the departments regarding this method have been feeble, because we have known of no way of making an exhaust system which has speed enough, which is fast enough to take out these poisons from a spray painting room and at the same time not exhaust the oxygen content of the room to such a point that it would not be a favorable place for human beings to work. That is, the speed of 200 linear feet per minute is too fast and the speed of 100 linear feet too slow to take out the benzol. We have, nevertheless, by our hearings on the subject, by our attempts to adopt codes, by our inquiries as to how this might be effected, tremendously stimulated the inventive mind with reference to the exhausting of these poisons from rooms where this kind of painting is being done, and I believe within the next two or three months we shall be able to make a requirement based upon a successful experiment in an improved technique, which improves the work as well as improving the atmosphere which the human beings have to breathe.

It is our duty as a Labor Department to see that pure air is available for workers. Incidentally, in this case, I believe there will be an improvement in the actual technique of the work itself, so that I cite the case merely as an illustration of what I mean by furnishing a favorable soil and a stimulus to experiments with and the invention of better techniques in all matters that have to do with the improvement of human relationship to industrial life.

The third great duty of government, I think, and of government departments, with reference to the solution of work problems, is to be a ready educational influence for spreading the gospel, so to speak, among that group of employers who will never think of these problems for themselves.

In the State of New York we have approximately 70,000 separate factory establishments, and 75 per cent of these employ less than 50 persons, so that really the great industrial plant in our communities is the exception, and the small industrial plant, the little employer, is the usual. When I think of the manufacturers of this State, do I think of two or three great overshadowing industries, employing thousands of men, with great, well-managed plants, employing scientists and personnel research workers, and all that sort of thing? No, when I think of the manufacturers of New York State I think of a lot of little men employing less than 50 people, doing business on a small capital, engaged in a highly competitive enterprise, having to save all they can, and having no time nor money to buy the kind of brains that engineering and personnel experts would bring to them for the management of their particular plant. Their unit of production, as a matter of fact, is too small to make it either possible or economical for them to put on so much overhead as would be indicated by the employment of that kind of brains. So it is the duty of the Department of Labor to spread among that group of employers, information and the help and technical suggestions that come from the observations of the Department in the great plants which do employ experts and can afford to make the experiments that in the end cut down the cost of production and improve conditions for the workers. And that, I take it, is one of the chief and prime duties of any government department which is set aside to promote the interests of labor, the interests of men and women in relation to their work.

And now, because at heart I am a missionary, I would like to say what I feel are some of the yet unexplored fields in which people like yourselves have a great mission and duty to perform. You can help us by giving us the raw material which we in the educative missionary department will disseminate among those employers who have not as yet found out these things for themselves.

In the first place, somebody has got to make a profound study, an economic, as well as a business and a human study of pension plans in relation to the employment of older workers. Some method must be devised for securing the desirable benefits of pension plans and group life insurance plans, without the terrible risk of jeopardizing the work and job opportunity of men who are beyond the age where they are cheap, insurable risks. That is one of the unfortunate episodes that has accompanied this entirely well-intentioned effort to set up pensions and group life insurance in some of our best industrial plants, and I believe that there are ways out of this unfortunate situation. One of the great industries of this State, the General Electric Company, has during this past summer announced a new method of writing and setting up its reserves on pension funds and on group life insurance which in their particular plant was already creating this discrimination—not that older men were being dismissed, but older men were not being taken on in new jobs because of the cost it added to their life insurance and pension plan. This revision includes a plan by which an individual over 45 who desires to be included in the pension and group life insurance systems, pays the differential between what it costs to carry a man under 45 and what it costs to carry a man over that age, or else accepts an inverse benefit so that the premium rate remains constant whatever the age of the individual, thereby making no economic disadvantage against the employment of older men. In other words, he pays just what you or I would pay as the difference between our insurance rate if we are over 45 when taking out a new policy and the rate if we are under 45 when taking out a new policy. Whether that same plan is adaptable to other industries or to other types of insurance and pension systems, I do not know, but someone must make the preliminary investigations and studies to make it possible for us to recommend to all employers a scheme of pension and group insurance plans which will not jeopardize the inalienable right to work of the older people in a community.

Then there must be a study in safe work habits. Here, it seems to me, you are peculiarly qualified to make an investigation which will result in certain definite, concrete, clear and understandable recommendations which the rest of us can teach to others. I am sure that the recommendation will run to some programme other than preaching the doctrine of safety, like a minister in a pulpit, when one goes into a factory. My own department, I am sorry to say—no, perhaps, I am glad to say—sponsors a little group of lecturers who go around to the different factories and get up in the noon hour and make speeches, telling the men how important it is to be sure they are doing things in the safest way, not getting their fingers or arms cut off; but that is not actually solving the problem. What we have got to do is to set up in people some kind of a habit which is automatic, which makes them move in a safe way with relation to the machinery which they handle. In other words, we are living in a mechanistic society, yet our motion habits, system of coördination and whatever bodily mechanisms that enter into action are adapted to a less rapid pace than the machine of to-day. We are not, any of us, quite safe in a mechanistic world. Perhaps those of us who can look out for ourselves are not exposed, the greater part of our lives, to dangerous machinery. It is relatively easy to adopt a certain kind of safety habit which enables us to dodge an automobile, or, at least, to watch out for it. But people who are exposed to dangerous machinery all the time, day in and day out during fatigue and personal and emotional crises, etc, have got to develop some new power of coördination which will enable them automatically to carry out their work in a safe way.

Just the other day I saw a case of a young boy, a lad of 15, who put his hand down on the table of one of these guillotine paper-cutters that they have to use in printing trades—there has never been any method discovered by which the guillotine paper-cutter could be discarded on small stock work—and his hand came off. Of course, why did he put his hand on that table? There is the problem. He had not been correctly educated; he had no coördination habits. When he was asked about it he said, yes, he knew there was a guillotine paper-cutter there when he put his hand on that table, but he had forgotten for the moment that it was the guillotine paper-cutter table. He did not register that; he registered something else, —that it was a place to put the hand, that's all.

We must set up in our people proper

habits. The continuation schools carried on in many states offer a very favorable opportunity for this kind of teaching. Our trade schools, apprentice schools, afford a fine opportunity to teach and develop certain psychological reactions which become automatic safety habits. If somebody will work out a curriculum, we can teach it; somebody should also make the preliminary scientific studies from which we can deduce certain simple principles which can be taught very, very simply. When we start out to teach these things we have to reduce them to terms that anyone can understand.

That reminds me of a young friend who came in to see me the other day and told me exuberantly that she had just finished reading the newest work of Einstein. I, remembering that Einstein had announced that there were only six or eight people in the world who understood his work, said to her, "That's nice, my dear, did you understand it?" "Oh, yes," she said, "I understood all of the words but none of the sentences." We have to reduce our knowledge of any schemes which you may propose, to such simple terms that all sorts of people will understand both the words and the sentences.

And then, somebody should teach us,—and, perhaps, Dr. Dewey, that's one of the things you ought to put your mind to in the next ten years,—somebody should teach us how to make industrial life for individuals an educative experience as well as a productive experience.

One of the most stimulating episodes of my youth was going to visit the school which Dr. Dewey founded in Chicago. I saw them educating children in everything by allowing them to take pieces of clay and make anything they wanted to out of it. They made bowls, pitchers, candlesticks, figures of people, and all sorts of things out of clay. I had expounded to me, then when the theory was new, that out of the mastery of material, out of making something with your own hands and handling the material, came the training of the mind in all particulars. I at once leaped to the conclusion, of course, that industry was therefore the most educative experience that one could possibly have. In industry you made things; but the old potter making each individual piece by hand is a far cry from the turning out of pieces by machinery in large quantities, all alike, with no one piece being conceived by the worker, completed by the worker and used by the worker. The educative experience is quite a different thing, and in industry has not been fully realized. I believe there is an educative life possible in industrial life. It is not being developed, not being explored, and we do not know how to develop it. But if such a large proportion of our people are going to spend the greater part of their lives in industry, we must make it a real experience and an educative experience, so that the time they put in there shall be good time and not just time put in somehow.

And then I think we have got to carry on some sort of experimentation which will lead us to certain conclusions about the wisdom of varied hours in different industries. Once we have a sort of basic understanding that an eight-hour work day is a minimum standard of decency for people in an industrial civilization, I think we have then got to go a good deal further. In some industries you probably should not work people or cannot work people for their own health's sake and for the productivity of the industry, as many as eight hours. But what are those industries? What are the hours that, constituting an entire day, will be most productive for the industry, most efficient, if we measure efficiency in long life terms rather than on an hourly production basis, and what will be most healthful and most satisfactory to the workers themselves?

These are only a few of the things that ought to be done. You all can think of many others where experiment is needed, where long studies must be made and where recommendations when finally formulated, must be made with force and authority.

As I said before, the government's function in industry is chiefly concerned with men and women. It is to establish and maintain certain humane standards. Industrial leaders have a tremendous opportunity and they have done great things, I think prodigious things, in this country in the improvement of machinery, in the improvement of techniques, in the improvement of method and in the improvement of production. And sometimes out of those improvements in technique and production have come great improvements in the life of the human beings working under these improved conditions.

Think, for instance, how much money, time and intelligence have been spent on conditioning air in certain industrial plants, when the material or the machines used in a particular enterprise required a certain temperature and certain humidity. Just think of the money spent in the steel industry, for instance, to get storage space, tremendous storage warehouses where steel plates may be stored, with no change in temperature or humidity, because such changes affect the steel itself. Think of the time and money spent in our film manufacturing concerns to keep the air during the summer, winter, spring and fall at exactly the same temperature. The Eastman film works, at Kodak Park in Rochester, is the warmest place in winter and the coolest place in summer. I know of no more delightful atmosphere, and it is because the substance itself requires an even temperature and that particular degree of humidity. Incidentally, it is a very comfortable, very good and very healthful atmosphere for the people who work there.

We can accomplish wonders if we have to in American industry for the conditioning of our air or conditioning of anything for the improvement of the material or improvement of the machines. Human welfare only comes as a by-product frequently. But thank God for that by-product when it does come. The duty and function of government in my opinion, is to see to it that this by-product,—a by-product of a system stimulated by economic self-interest if you will,—to see to it that this by-product is put on the market and that it is advertised, and finally, like vaccination, required for entrance into a civilized industrial society.

The Study of Work Feelings[1]

By Arthur W. Kornhauser, *University of Chicago*

A contributor to earlier volumes of the Personnel Journal, Professor Kornhauser here summarizes his reflections on the purposes and value of factual studies in a difficult but inescapable zone of industrial psychology.

With rare exceptions, investigations of workers' feelings have been either general descriptive studies or inquiries into specific situations for practical purposes. The question is raised here whether it is possible to go beyond these studies to the establishing of signficant *general* relationships between workers' feelings and various features of working life and individual personality.

INTEREST in workers' feelings and attitudes is not something new. Writings in the fields of labor and social reform contain many and long discussions of what modern industry means to the worker with respect to his interests, motivation, and satisfactions. The uprooting effects of the World War and the attendant unrest, together with the feverish acceleration of technological change in recent years, have brought renewed attention to these problems—not only at the hands of theorists but also by men in the midst of practical management affairs. Perhaps the central objective of modern labor management and personnel work can be said to be the heightening of morale or improving of workers' attitudes. But with all the interest in these matters, both social and managerial, extraordinarily little has been done in the way of careful collection of information. Broadly conceived research studies are almost unknown.

Industrial psychologists have rather generally been willing to measure the results of their work in terms of output and efficiency, without bothering greatly over intangible and unmeasurable attitudes or satisfactions. It has been considered easier to sell psychological results by showing reductions in unit costs. Psychologists have frequently assumed, and at times bluntly stated, that industrial psychology is to be judged by the standards of the accountant.

Those of us interested in workers' feelings or attitudes can point out two simple objections to such a viewpoint: first, a great deal of significance slips through the accountant's sieve—often matters of profound, long run importance to a business (matters by no means overlooked by the competent business executive, be it noted); and second, we see no reason for thinking of industrial psychology exclusively as hand-maiden to management. The increased profit standard is one among others and for many purposes the satisfaction of industrial working people may be more worth investigating than production costs.

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[1] Paper presented as a communication to the Symposia on Industrial Psychology at the Ninth International Congress of Psychology, Yale University, September 3, 1929.

Vocational selection procedures, training programs, rest periods are evaluated in terms of changes in efficiency. Why not also by references to satisfactions? Of course, the two are not independent; often a study of morale is highly significant in its bearing on output. But even where it is not, we may be interested in the individual and social effects of the work. Industrial psychology is a social science as well as a managerial or technological discipline.

Our chief interest in the present paper centers in the question of what has been done and what can be done in the way of significant studies of workers' feelings. A few studies have been reported both from the laboratory and from industry. A wide gap separates these two groups. One may guess that there is little in common between curves of satisfyingness of university students spending a few hours in the laboratory multiplying numbers or being intelligence-tested, and the day-to-day feelings of the class-conscious wage-earner grinding along in his appointed place in an impersonal industrial system. It seems to me that such conclusions as Thorndike and Poffenberger have drawn as to the slight relationship between the curves of feelings and of efficiency are cases in point. I am not at all sure that the laboratory studies of Münsterberg, Burnett, Winkler, Wunderlich, Wyatt, and others are not open to the same question. In this realm of motivation and feeling, the distance between an artificial laboratory set-up and the work-a-day world is likely to be far greater than in most other problems. Laboratory studies are certainly not to be summarily discarded, but one may well demand evidence that similar findings can be expected in industry. The parallel cannot be assumed.

Accordingly we are more concerned here with the attention that has been given directly to industrial workers' feelings. Here an interesting situation presents itself. On the one hand we have an extensive theoretical or armchair literature concerning industrial unrest, joy in work, morale and interest. On the other hand we have a number of empirical inquiries—using interviews, questionnaires, and statistical analyses. But the two have little relationship. The theory and the research are rarely brought together.

Some of the studies are good and valuable pieces of work—surveys of attitudes in particular groups like the inquiries of Levenstein and De Man in Germany and the more recent studies of Lipmann; careful statistical analyses of work curves as in Wyatt's researches; practical studies of special working groups as conducted by Mayo, Houser, and others. But these investigations, with only rare exceptions, are either general descriptive studies or practical inquiries into specific situations. I am interested in raising the question whether we can do something more—whether we can reach beyond particularistic and practical understandings of workers feelings and beyond descriptive accounts. Can we bring industrial inquiries to bear upon the theories which at present flourish unmolested by any accepted body of facts?

To be sure, the problem of measuring or rating complex feelings presents real difficulties. We are only beginning to devise techniques. But even with the crude methods available much may be done. Further development of questionnaire and interview procedures will doubtless be helpful, but I am convinced that other more neglected aspects of the problem are no less in need of discussion.

The general problem comes down to this: can we feel our way toward general and significant relationships between workers' feelings and various features of working life and individual personality? Can we break up the "total situation" which determines worker reactions and deal analytically and statistically with the influences involved? Can we separate the incidental and particular factors from the general or universal?

Let me illustrate: Workers' feelings of boredom or monotony are certainly reflections of complex total situations —of factors both in the worker and in the work and in their inter-relations. One type of research—often practical and valuable—aims to ascertain the extent of this dissatisfaction in a given group and to detect some of the particular influences operative in that situation as a way of deciding on remedial measures, for example rest periods. But another type of research, possibly of little direct interest to the particular employer, would begin not with the practical problem but with some general question or hypothesis, for example the hypothesis that repetition work can be classified into several categories as regards the demands on the attention of the worker and that the feelings of monotony are associated with these differences. The investigator then collects evidence which will lead to the acceptance or rejection of his hypothesis. The illustration indicates precisely what one investigator—Wyatt of the Industrial Health Research Board—has done. His careful reports are almost unique in the literature of studies of industrial attitudes or feelings—unique, that is, in their attempt to arrive at general relationships on the basis of the industrial data.

Why not similarly take other hypotheses, for example that satisfaction in a job is largely dependent upon the esteem in which the job is held (as developed by Whiting Williams for example), and collect data—not merely illustrative cases—to support or deny or modify the generalization? Or the widely held view that dissatisfaction in industry is a matter of individual temperament? Or is dependent upon intelligence? Or upon health? Or that it comes from the thwarting of desires for self-expression or that work-satisfactions are increased through a knowledge of the total processes in which one is working?

In all such studies a difficulty, aside from ascertaining the attitudes, lies in defining clearly the variable to be studied in relation to work-feelings and in finding adequate measures. But a still more disturbing question arises, whether analytic relationships of the sort discussed can really be generalized. Perhaps the relationships of a given influence are vastly different depending upon the presence or absence of other conditions, and the interdependence may well be so complex as to defy mathematical treatment. Perhaps the variables are so interwoven that the other-things-being-equal type of assumption becomes absurd. Possibly we need looser, less quantitative hypotheses that talk more in terms of the effects of "types of industrial situations" or "classes of worker-work relationships." These matters are universal worries of the social science investigator—but that makes them no less difficult.

But whatever the difficulties and whatever the poverty of present knowledge, the problems are so central and inescapable and so clearly problems of industrial psychology—if it chooses to be a social science as well as a managerial technique—that it appears well worth our while canvassing the possibilities of further promising research in the field. Among the few greatest questions of our age is that which asks what modern industry means to the individual worker with reference to his satisfactions and fullness of life. The research literature in industrial psychology to date gives little indication of an appreciation either of the importance of the issue or of the possibility of scientific treatment of the theories. But clearly our loosely formulated theorizings on these questions need clearer definition and need to be treated as scientific hypotheses subject to support or denial by accumulations of evidence.

Manuscript received October 7, 1929

Appendix

A CORRECTION

Errata: "The Human Factor in Substation Operation; Specifications and Tests for Substation Operators," appearing in the Personnel Journal for August, 1929, Vol. VIII, No. 2, pp. 81–113.

An error has been discovered in the calculation of the $\frac{\text{Diff}}{S.D.\ \text{Diff}}$'s in this article. The corrected values and one or two changes in text which the corrections entail are given below.

The error in calculation grows directly out of the incorrect citation of the formula for calculating $\frac{\text{Diff}}{S.D.\ \text{Diff}}$'s in *Psychology of Selecting Men*, by Donald Laird. On page 232 of this text, the formula is given as:

$$S.D.\ \text{Diff} = \sqrt{\frac{S.D.\ a^2_2}{N} + \frac{S.D.\ a^2_1}{N}}$$

The N does not belong in the denominator, the correct formula being:

$$S.D.\ \text{Diff} = \sqrt{S.D.\ a^2_2 + S.D.\ a^2_1}$$

Not only is the formula incorrectly cited, but a sample problem involving the use of the incorrect formula is solved in which the significance of the difference in the height of two groups of 5 individuals is calculated.

The *S.D.* Diff's given in the article were calculated by an assistant in whose accuracy the author has reason to place great faith. The assistant was instructed to check the formula before calculating the indices. The standard text employed for this purpose (*Statistics in Psychology and Education*, by H. E. Garrett) not being available at the moment, he made use of Laird's text and employed the formula given there. In going over the assistant's work, the author noted an apparent discrepancy between the values of the differences and the values of the $\frac{\text{Diff}}{S.D.\ \text{Diff}}$'s, and required the assistant to check the calculations a number of times prior to publication. However, the author failed to take the next obvious step of checking the formula used by the assistant in his calculations.

The corrections are as follows:

Page 99:

TABLE 3

GROUPS COMPARED	$\frac{\text{Diff}}{S.D.\ \text{Diff}}$
Best and Average Operators......	3.2
Best and Poorest Operators......	5.2
Average and Poorest Operators..	3.4

Page 99:

TABLE 4

NUMBER OF ERRORS	$\frac{\text{Diff}}{S.D.\ \text{Diff}}$
0–1	.76
0–2 or more	2.7
0–3	3.3
1–2 or more	1.9
1–3	2.8

Page 100: Column I, lines 9 and 10 should read, "The differences between averages are reliable ones for groups separated by more than one error."

Column I, line 21:

$$\frac{\text{Diff}}{S.D.\ \text{Diff}} = 2.9$$

Page 103:

TABLE 6

GROUPS COMPARED	$\frac{\text{Diff}}{S.D.\ \text{Diff}}$
Senior and Best Operators.......	3 00
Senior and Average Operators...	0.65

Column I, line 11 should read, "The difference in Average Test Score between Senior operators and Average operators is not significant."

Page 109: Column I, line 1 should read, "However, the difference is not statistically reliable." Line 2:

$$\frac{\text{Diff}}{S.D.\ \text{Diff}} = 1.2$$

A careful review of these changes will show that the validity of the findings suffers only at one relatively insignificant point of the study, that involving a comparison of the Average Test Scores of assistant operators "In service" and "Out of service." Although there is a difference between these two groups in Average Score, favoring those "In service," the difference is far from reliable.

The author makes his apologies to the Editor and the readers of the Personnel Journal for permitting these errors to creep into print.

Morris S. Viteles,
University of Pennsylvania.

News Notes

PERSONNEL RESEARCH FEDERATION

Activities of Member Organizations

Federal Board for Vocational Education

This report of the activities of the Federal Board for Vocational Education was prepared by Mr. Frank Cushman, Chief of the Industrial Education Service:

"The Federal Board for Vocational Education has two principal types of responsibilities under the several acts which it is responsible for administering. These responsibilities are as follows:

1. The administration of the National Vocational Education and Civilian Vocational Rehabilitation Acts in cooperation with the states and certain territories.
2. Under both of these Acts the Board is responsible for making, or causing to have made, studies and investigations concerning vocational education in agriculture, trade and industry, commerce, homemaking, and the rehabilitation of disabled civilians.

"The list which follows includes the principal studies that have been carried on by the Board during the year. In certain cases these studies have not yet been completed:

"In the field of vocational home economics education three studies are in process of completion, as follows: (a) The training of home economics teachers; (b) Part-time education for homemakers; and (c) Special courses in home economics for adult groups.

"In the field of civilian vocational rehabilitation, a study has been carried on during the year which consists of an analysis of data on cases rehabilitated during the fiscal year 1928–29. The basis for this study is data on 5,012 cases.

"Another study in the rehabilitation field has to do with the relationship of artificial appliances to possibilities for employment.

"The Federal Board is now cooperating in a special study of opportunities for the employment of handicapped persons in the City of Minneapolis. The purpose of this study is to determine the possibilities in that city on which an individual with a specific handicap can work without economic disadvantage, either with the handicap or with the aid of artificial appliances.

"In the field of trade and industrial education one study has been completed during the year in connection with apprentice training in granite cutting. This study was carried through in cooperation with the apprentice commission of the granite industry and has been published as Federal Board Bulletin No. 137. Two other studies are now in process, as follows: (a) A study of the efficient use of lumber in frame construction. This work has been carried on in cooperation with the United States Department of Commerce, the National Lumber Manufactuers Association, and other groups. (b) A study of the training requirements involved in the architectural terra cotta industry. This is still being carried on in cooperation with the National Terra Cotta Society."

United States Civil Service Commission Forty-Sixth Annual Report

In its annual report for the year ending June 30, 1929, the United States Civil Service Commission recommends optional retirement at the age of 60 after long service, stresses the importance of character investigations, especially for positions of trust, and renews its recommendations that presidential positions which are not policy determining be classified under the civil service law and that the competitive examination system be extended to all positions under the municipal government of the District of Columbia.

Outstanding paragraphs of the report follow:

Retirement: "Retentions exceed retirements for age. Two-year extensions beyond retirement age have been granted 12,375 employees; and enough of these have obtained one or more additional two-year extensions to increase the number of continuance certificates to 19,745; but only 18,910 employees have been retired for age upon annuity. This indicates that employees generally do not desire to retire, and that the actuarial assumption is incorrect that any considerable per cent of them would be tempted to retire by an increase of annuity or an option in retirement age. . . . .

"The fact that 20.87 per cent of all annuitants now on the roll were retired for total disability before they reached retirement age indicates that there are many in the service whose efficiency is impaired but who can not now be retired, their disability not being total. A lowering of the retirement age and an optional retirement, say at the age of 60 after long service, would make for greater efficiency."

Prohibition Examinations: "The current requirements of the Bureau of Prohibition for eligibles for administrative positions appear now to have been met through competitive examination. . . . .

"The field work incident to the examination for agent, as well as similar work on examinations for agent and inspector, antinarcotic act, and storekeeper-gauger, is still in progress. It is anticipated that all of these examinations will be completed and registers of eligibles established within the calendar year 1929."

Veteran Preference: "From the passage of the veteran preference act of July 11, 1919, to June 30, 1929, 134,813 persons entitled to preference were appointed. . . . .

"From the issuance of the Executive Order of March 3, 1923, ... to June 30, 1929, 7,366 disabled veterans were appointed, 1,637 having been appointed in the last year."

Promotion of Women: "During the fiscal year women employees in the various departments qualified through noncompetitive examinations for such positions as assistant architect; assistant chemist; assistant entomologist; business specialist; assistant business specialist; claims examiner; junior and assistant home economics specialist; assistant editor; junior, assistant, and associate attorney; and junior librarian. Some started their careers in the lower grades of the same work, but many of them have advanced from clerks and stenographers."

Character Investigations: "It may be accepted as fundamental that no law, however worthily conceived, can be more honestly and effectively enforced than those entrusted with its enforcement are themselves disposed and able to enforce it. This principle is especially applicable in the selection of honest and qualified persons for appointment to law enforcement positions.

"Experience has demonstrated the definite need for a searching inquiry into the qualifications and general suitability of persons seeking appointment to positions of responsibility and trust. . . . .

"Up to the present time, arrangements have been made to take fingerprints (of applicants) at approximately 1500 places throughout the country. . . . . During this fiscal year, 3,296 detections were made of persons with court records who had denied having them."

Bureau of Labor Statistics

A large part of the work of the Bureau of Labor Statistics of the United States Department of Labor comes within the field of personnel research. During the fiscal year ending June 30, 1929, and subsequent months of the calendar year, the Bureau has continued its wage studies and has published, in addition to union wage scales, wages and hours in foundry and machine shops; slaughtering and meat packing; the manufacture of worsted and woolen goods, cotton goods, hosiery and underwear, men's clothing, and boots and shoes; the motor vehicle industry; the lumber industry; and wages and hours of common street laborers.

Accident studies cover settlements for accidents to American seamen, and statistics of industrial accidents in the United States to the end of 1927. Bulletin No. 488 is a report on Deaths from Lead Poisoning, 1925–1927.

A study of the public service retirement systems in use in the United States and in foreign countries has been made and published. Other special surveys include "Conditions in the Shoe Industry in Haverill, Massachusetts," "Health and Recreation Activities in Industrial Establishments," and "Apprenticeship in Building Construction."

The trend of employment is reported upon currently in the *Monthly Labor Review of the Bureau of Labor Statistics.* Articles dealing with other phases of personnel work—labor turnover, employee stock ownership, vacations, etc.—appear frequently in the *Monthly Labor Review.* The Bureau is now compiling a revised edition of its handbook and directory of Personnel Research Agencies.

The Work of the Women's Bureau from November, 1928, to November, 1929

In the past year the Women's Bureau has consistently performed the duty with which it is charged, namely "to formulate standards and policies which shall promote the welfare of wage-earning women, improve their working conditions, increase their efficiency, and advance their opportunities for profitable employment."

The bureau's field is extensive and of great human interest. The Census of Occupations of 1920 reported the total number of women gainfully occupied in the United States as over eight and a half million. Analysis of this figure showed that one in every five women in the entire United States was a wage earner and that one in every four wage-earning women was married and one in every five a girl under twenty. To what extent the status of women has changed since 1920 can not be more than guessed at until the publication of the next census figures. The importance of women as a labor supply, the cheapness of their labor as compared with that of men, the hazards of certain jobs as industrial processes change, the difficulties of the double job of wage earner and mother—these are matters of special concern to the American people.

It is the purpose of the bureau to collect, correlate, and make available for reference a mass of information that shall be accepted by employers, employees, health authorities, women's organizations—in fact, all interested persons—in their combined efforts to insure to all employed women good working conditions and satisfactory employment relations.

The following summary gives the main activities of the bureau during the past year:

Women's earnings in the cotton textile industry: An analysis was made of pay-roll figures collected from textile mills by the Bureau of Labor Statistics for 33,000 women in 114 establishments in 1924, 36,000 women in 151 establishments in 1926, and 38,000 in 158 establishments in 1928.

State-wide survey of wage-earning women in Florida: A survey was completed of the hours, wages, and working conditions of over 6,000 women in factories, stores, and laundries, and of approximately 1,400 women in 63 hotels and restaurants in Florida, bringing the number of state-wide surveys made by the bureau during the 11 years of its existence up to 20. Personal information was secured from some of the workers through questionnaires. The other data were obtained from pay rolls, plant inspections, and consultations with employers.

Women in limited-price chain department stores: Facts have been assembled from the bureau bulletins on State surveys for well over 5,000 women in 253 limited price chain department stores in 18 states. As a supplement to these data pay-roll figures for a week in 1928 for about 6,000 women in 179 establishments were compiled for the most part by the bureau's agents. Over one-half of these women were employed in the same States for which earnings had been reported in the earlier surveys, many identical establishments being included.

Women in laundries: This study covers hours, earnings, working conditions, and personal information for almost 20,000 women in 290 laundries in 16 States. The personal information was supplied by the workers themselves, but all other data were obtained by the bureau's agents from pay rolls, inspection of plants, and interviews with employers.

Variations in employment trends of women and men: The figures presented in this survey show the trends of employment for women and men in Ohio in 54 industrial or occupational classifications over a period of 11 years, 1914 to 1924. For each of the classifications curves have been drawn that show graphically when and to what extent trends for the two sexes have differed or coincided. State employment records constituted the source of the material.

Negro women in industry: Information in the various State reports of the bureau in regard to occupational distribution, working hours, earnings, and personal history of negro women was compiled in one bulletin, with detailed discussions on the various subjects covered—the report includes some type of data for more than 17,000 negro women.

Conditions of work in spin rooms: This report consists of two parts. The first gives a detailed analysis of the lost time and labor turnover records in four mills where a new method of spinning had been introduced in whole or in part, the purpose being to ascertain the attitude and reaction of the women spinners toward the change in method. The second part attempts to disclose to some extent what is being achieved in heat regulation in cotton mills where careful management is anxious to have the work run as well as possible. Dry-bulb and wet-bulb readings for 15 mills—7 in the North and 8 in the South—and covering various periods from June, 1924, to November, 1927, were reported.

Causes of absence for men and women in four cotton mills: An analysis of somewhat detailed absence records of both men and women in two northern mills and two southern ones was made by the bureau during the past year to supplement its 1923 study on causes of lost time among women in cotton mills.

What women contribute to family support: An article on the wage-earning woman's contribution to family support, written for the *Annals of the American Academy of Political and Social Science* will soon be published by the bureau as a bulletin.

Denver married women applying for jobs: A study was made of the economic responsibilities of two groups of women who were or had been married: First, from data supplied by a Denver store concerning 103 applicants; second, from the Denver Young Women's Christian Association employment records for 345 applicants.

Industrial accidents: Data on industrial accidents classified by sex and published in various State reports for the years 1920 to 1927 inclusive, were collected and analyzed.

Industrial home work: A summary was made of recent studies pertaining to industrial home work, including a list of references on the subject.

Bibliographies: Lists of selected references were prepared on the following subjects: Women in industry, their health, their hours, their working conditions, and their share in family support.

Division of public information: The work of public information has gone steadily forward during the year. It has included news releases on all new bulletins and outstanding activities of the bureau, popular and technical articles on the various problems connected with wage-earning women for many types of magazines, the furnishing of information to correspondents of newspapers and press associations and to editors of periodicals upon request, radio talks, and the preparation and circulation of popular exhibits.

The most important exhibit features of the year have been—

1. An attractive and informative exhibit, depicting women's wage-earning activities in the U. S. installed at the Iberian-American Exposition at Seville.
2. Preparation of a new one-reel motion picture, "The Story of the Women's Bureau," portraying the history, activities, and standards of the bureau.
3. Preparation of a new series of charts on negro workers, and several new posters.
4. The purchase of a motograph and preparation of five strips on subjects pertaining to wage-earning women for use in this machine.
5. Constant circulation of bureau exhibits, which have been sent into every State of the Union and to a few foreign countries.

Current work: Important studies now in progress cover wages of women in 13 States; women in Hawaiian pineapple canneries; women in domestic service; Young Women's Christian Association employees; women in meat-packing plants; conditions for women in the cigar industry; women's output under various hour schedules; and opportunities for women doctors.

Publications:

No. 61. The Development of Minimum-Wage Laws in the United States, 1912 to 1927.
No. 65. The Effects of Labor Legislation on the Employment Opportunities of Women.
No. 66. History of Labor Legislation for Women in Three States; Chronological Development of Labor Legislation for Women in the United States.
No. 67. Women Workers in Flint, Michigan.
No. 68. Summary: The Effects of Labor Legislation on the Employment Opportunities of Women.
No. 69. Causes of Absence for Men and for Women in Four Cotton Mills.
No. 70. Negro Women in Industry in 15 States.
No. 71. Selected References on the Health of Women in Industry.
No. 72. Conditions of Work in Spin Rooms.

The following bulletins are in the printing office:

No. 73. Variations in Employment Trends of Women and Men.
No. 74. The Immigrant Woman and Her Job.
No. 75. What the Wage-Earning Woman Contributes to Family Support.
No. 76. Women in 5-and-10-cent Stores and Limited-Price Chain Department Stores.
No. 77. A Study of Two Groups of Denver Married Women Applying for Jobs.

Work of the Personnel Research Bureau at Vassar

Last year's senior class was offered the opportunity of taking available aptitude tests for the following fields: Teaching, librarianship, clerical and secretarial, technical and scientific, physics, chemistry, mathematics, medical, social work, art, music. This service was administered individually on voluntary request. Approximately ten per cent of the class responded. Results were used in connection with advice based upon subjective evidences of ability and interest.

Every member of the senior class was given the Allport A-S Reaction Test. A comparison is now being made of data from this test with Laird Inventories, extra curricular activities and positions now held by graduates of the class of 1929.

Twelve seniors cooperated with the American Council on Education in answering questions upon experimental vocational monographs in the fields of librarianship, medicine, banking, and work with the American Telephone and Telegraph Company.

Self-rating sheets were devised for students' judgments of their adaptability for teaching and for mental hygiene or social work. These were utilized in vocational conferences by those students who wished to consult both the psychologist and the placement secretary in making their decisions.

Lectures are given to the Freshman class by the Director of the Personnel Bureau on "Technique of Study" and "General Mental Hygiene."

The following studies are under way:

Relation of Scholastic Aptitude Test scores to Freshmen year grades in English courses.

Relation of College Entrance Examination Board examination grades in English to Scholastic Aptitude Test scores.

Relation of College Entrance Examination Board examination grades in English to Freshmen year grades in English.

Personnel Work at Connecticut College

Personnel work at Connecticut College includes everything from the giving of very general college information to the more specific help along the lines of educational and vocational guidance. The first aim and desire of the bureau is to consider personnel work as an educating process starting with the Freshman and continuing just as long as the student has active dealings with the bureau. To this end the office works with four distinct groups (1) the undergraduate body, (2) the alumnae, (3) the faculty, and (4) the town of New London. The work with these groups may be summarized in this manner:

Undergraduates: Talks to each entering Freshman class explaining the work of the bureau and its methods of procedure. Interviews with 169 Freshman; 76 Sophomores and Juniors, and 80 Seniors. Securing work for students resulted in 28 placements in unclassified occupations; 45 girls in the college dining halls; 8 college bookstore; 6 college post-office; 8 private secretaries. A study of Summer Work was made for all four classes. 108 students worked in 14 different occupations. Largest amount earned, $325 in tea room. Second largest, $220 in an office and store. Summer positions were found for as many girls as possible in camps, social agencies, hotels, offices, etc. In senior placement 42 per cent of those who designated their desire to work were placed directly by the bureau. 11 per cent were placed indirectly through the efforts of the bureau. 47 per cent through friends, agency contacts or personal efforts. Complete senior registration was accomplished with duplicate credentials filed for each graduate. Interviews with principals, superintendents, agents, heads of organizations, and camp directors were arranged with the students.

Alumnae: The *Alumnae Register* published annually entails the sending out of 1,782 letters with enclosures. Returns are compiled, sorted, typed and published by December of the current year. 20 returning alumnae brought their credentials up to date and discussed future plans. 90 requested to be put on the active file for better positions. Between 500 and 600 requests came in during the course of the year for the credentials of the graduates.

Faculty: Information on problem students; discussion of majors; job possibilities; recommendations for seniors.

Town: Requests for Speakers: readers and entertainers; scout leaders; Y.W.C.A. club leaders; coaches; cheer leaders; teachers.

The clerical side of the personnel work at Connecticut College is in itself a task. The office set-up includes 10 files, 6 of which require annual revision with the addition of up-to-date information. The correspondence is heavy due to the frequent requests for information on the work of the bureau, the necessity of obtaining and disseminating vocational information, arranging the schedule for vocational speakers, and close contact with the alumnae.

HIRING-AGE LIMITS INVESTIGATED

As the result of an investigation of several hundred manufacturing firms made by the Employment Relations Committee of the National Association of Manufacturers it is reported that 72 per cent of the plants of the country have no set maximum hiring-age limits. The remaining 28 per cent refuse to hire new employees beyond fixed ages. In this group the most frequent limit is said to be 45 for unskilled and semiskilled workers and 50 for the skilled. Some of the reasons assigned for setting maximum hiring-age limits include: physical conditions of the workers; the alleged tendency of older workers to slow up at their tasks; the liability of older employees to injuries; and increased insurance premium costs occasioned by large numbers of aged employees.

INDUSTRIAL PSYCHOLOGY FOR FOREMEN

With the realization that the foreman's job is one requiring, in addition to a technical grasp of the work, understanding and knowledge of the various elements of human relationship, a class in industrial psychology has been established at the Edgewater plant of the United States Aluminum Company. The principal objective of the course is to acquaint the foreman or other plant executives with the contributions of modern psychology to industrial management, and particularly to personal leadership.

MENTAL HYGIENE AND INDUSTRIAL PSYCHOLOGY

Preliminary announcement of the program of the First International Mental Hygiene Congress, to be held May 5–10, 1930, reveals that the industrial and personnel field will not be neglected. One paper will be on the general topic of mental hygiene in industry, personnel work and vocational guidance; another will deal with the types of personnel required in mental hygiene work; while a third will outline the possibilities in the future of human relationship in the light of an increasing knowledge of those factors that help and hinder the emotional, physical, and intellectual development of the individual.

EARLY ATTITUDES AND INTERESTS STUDIED

Among the many valuable studies pursued by the very active Institute of Child Welfare of the University of California is one of interest to the more scientifically inquisitive student of personnel. Data were collected upon the fundamental attitudes of ten boys and ten girls between the ages of 17 and 19 months in relation to eight sets of play materials presented in experimental situations at weekly intervals. Perhaps that sounds like a far throw from the problem of ultimate happy adjustment of individuals to their environment, economic and social. But very possibly it may prove to be of more than purely theoretical interest to ascertain the permanency of attitudes; the relationship between early attitudes and later vocational interests and adjustments; and the earliest ages at which fundamental, possibly far-reaching attitudes form, together with methods of influencing their formation.

NEW YORK STOCK EXCHANGE

Cameron Beck, Personnel Director of the New York Stock Exchange has prepared a report of the progress of his department during the past ten years. Among the outstanding developments are the following: complete service records of all employees; special committee to review all salary increases; standardization of salaries; introduction of sick leave payments, group insurance, and retirement annuities; Organization of the New York Stock Exchange Educational Institute; change of educational status of junior employees at time of employment from elementary to high school graduates.

Book Reviews

A GLANCE AT BRITISH LABOR RELATIONS

British industry today. By Ben M. Selekman and Sylvia K. Selekman. New York: Harper & Bros., 1929. Pp. 290.

Reviewed by Edward S. Cowdrick

Mr. and Mrs. Selekman in the course of a European trip in 1927 and 1928 made a comprehensive study of British industrial and economic conditions and the first published result of this study is *British Industry Today.* The book suffers from the authors' efforts to cover too broad a subject in a restricted space. In a volume of less than 300 pages they give a rapid survey of the whole field of labor relationships in Great Britain and of a considerable part of the economic background against which these relationships must be viewed. The result is what might be expected—a book which contains much valuable information for the casual reader but which is certain to be somewhat of a disappointment to the serious searcher for fundamental facts. That the authors are aware of this inevitable defect there is evidence in the introductory chapter, where they say: "We gathered a large amount of data during this investigation. We wish the reader to look upon this book, however, not as an exhaustive study, but rather as an exploratory survey of the field. Ideally each of the subjects dealt with should be treated as a separate, carefully documented monograph. In fact, we ourselves hope on later occasions to submit to the specialized reader in labor economics and industrial management detailed papers on some of the aspects treated here, as well as similar material from other countries which we gathered in our study." These promised additional volumes will be awaited with interest by American students of European labor conditions.

In beginning their description of British industry, the authors contradict the opinion widely held in America that relations between employers and workpeople in England are normally characterized by strife and ill-feeling. "Only coal has been marked by chronic turbulence. . . . . Even the general strike had its origin in the coal dispute of 1926." For industry in general the Selekmans find "old gospels of militancy receding—at least for the time being—before attempts to attain some constructive understanding between employers and employees." For the degree of peace and coöperation that prevails in spite of business depression and unemployment, the authors give much credit to "the operation of old, historic machinery for the conduct of industrial relations." The machinery referred to is the structure of organization and agreements built up under trade unionism.

Early chapters in the book briefly describe union organization, methods of dealing contractually with employers, and recent governmental action bearing upon labor relationships. The Whitley Councils are described as being somewhat more numerous and active than generally has been realized on this side of the Atlantic. Whitley Council machinery is in operation for industries "employing in the neighborhood of three million persons." Nevertheless, the authors concede that the Whitley Council movement fell short of the ambitious hopes of its sponsors.

Some readers will conclude that the most interesting chapters are those devoted to shop committees. It is true, according to the authors, that "the shop committee movement has had a more limited development in Britain than in any other important industrial nation." Nevertheless, particularly in a few conspicuous examples, shop committee systems have achieved outstanding results. The plans in effect in two companies—Hans Renold, Ltd., and Rowntree and Company, Ltd.—are described in some detail. In each of these companies a shop committee system, generally similar to an American employee representation plan, is functioning under union conditions and with the coöperation of union officials.

Among all the measures for securing harmony and coöperation in employer-employee relationship the most hopeful, in the view of Mr. and Mrs. Selekman, is the Mond-Turner conference. At the time the book was completed the fate of Lord Melchett's proposal still hung in the balance, but the authors believe that the project "has initiated an evolutionary process and method that offers not only Britain but the world at large an opportunity to discover how far social reconstruction can be peacefully and democratically controlled by man. . . . . In a word, then, labor is willing and the future, therefore, lies with those in control of British industry today. If British employers can throw off their habit of conservatism, quicken their vision, and develop a willingness to experiment, the world may witness a peaceful, orderly revolution of far-reaching consequences. If not, labor may swing to the left again."

LABOR MANAGEMENT

By J. D. Hackett. New York: D. Appleton & Co., 1929. Pp. 681

Reviewed by Ordway Tead

Mr. Hackett has supplied an excellent panorama picture of the activities now usually administered in industry by the personnel department. The procedures reviewed are up-to-date and are clearly set forth. As an objective study this is thoroughly workmanlike and inclusive. The only important exception to this which one notes is a minimizing of references to the way in which collective bargaining with labor unions may require alterations in the personnel policies and methods typically employed. The functions, work and significance of labor unions in relation to management merit somewhat fully evaluation. Indeed, it is this lack of emphasis on appraisal which seems to this reviewer to be the book's only deficiency. It is too completely descriptive and not enough critical. This gives the uninitiated reader too great a sense that this field is static, whereas in fact it is of course still highly dynamic, evolving and experimental on many points. Implicit in this comment is the further fact that no philosophizing about the inner meaning of personnel work is given; nor is there underlying the whole discussion that psychological point of view which relates methods to the needs and characteristics of the human nature which is in a sense the raw material as well as the justification of personnel activities.

Nevertheless the book will supply a valuable rehearsal of procedure. As Mr. Lewisohn says in his Introduction, "a volume such as this will serve to impress upon managers generally how important a part of their day's work is the problem of labor administration."

THE OLDER WOMAN IN INDUSTRY

By Johanna Lobsenz. New York: Charles Scribner's Sons, 1929. Pp. 272.

Reviewed by Amy Sturtevant Hobart.

How old is the "older woman"? Can she be employed with advantage? Can she secure her own jobs; if not, where should the responsibility for assisting her lie? These questions, of interest to individuals, groups and committees, are discussed in Miss Lobsenz's book.

The study is confined to Manhattan, New York, and to the woman over thirty-five, since that is the age when years begin to count against her in getting a job. Throughout the investigation the author, like most investigating committees, sees the worker's point of view more vividly than the employer's. She reports that the older woman's faults of personality are harder to forgive because there is less hope that she will be able to overcome them. Yet the older woman worker is faithful and brings interest to the point of devotion. These virtues count lightly with the employment manager, however,—especially the woman employment manager, who wants none of the older women,—or very little.

In consequence, employment managers and officers come in for some sharp criticism, although no outsider can possibly know the difficulties involved in dealing with a group which requires special time and attention.

Though the author has done a real service in presenting so concretely the case of the older woman who must earn, in weighing her assets and handicaps, and in calling attention to the grave extent of this problem without a precedent, it will take detailed studies, made over a long period, to discover how widely, and under what conditions, the older woman can be satisfactorily employed, and how her abilities can be evaluated. The recent appointment of a commission on old age insurance in the state of New York indicates that the situation has passed beyond the power of the individual to cope with it, and that its solution demands the coöperation of industry and the state.

The book will interest employment managers, social workers, and all those who are dealing practically with the situation. Suggestive chapters are those describing what the "Help Wanted" columns of the daily press show; also those narrating some individual cases and their efforts to solve their own problems. While the final chapter outlines various tentative solutions, the chief purpose of this study has been to arouse interest in the subject, and by presenting a body of material to stimulate discussion.

THE CASE METHOD IN GUIDANCE

Cases in the administration of guidance. By John M. Brewer. New York: McGraw-Hill Book Co., 1929. Pp. 300.

Reviewed by Phyllis Blanchard

The four main divisions of this book convey some idea of its contents: Part I, Educational Guidance; Part II, Vocational Guidance; Part III, The personnel and Equipment for Guidance; Part IV, Plans for Educational and Vocational Guidance. It will perhaps add to the clarity of reviewing to consider these separately.

Part I suggests the many factors to be taken into consideration in understanding causes of pupil failures, with especial reference to junior and senior high school and college. The solution of these problems is implied through improvement of methods of study, the use of psychological and educational tests, grouping of pupils according to ability, guidance in making educational choices, and—most important of all—the adjustment of home-school situations through the services of the visiting teacher. Other educational problems, such as attendance, meeting college entrance requirements, scholastic preparation of high school athletes, etc., are also included for discussion.

Part II takes vocational guidance from a broad viewpoint, describing many different methods. Educational and exploratory try-outs in Junior High Schools, vocational guidance aspects of clubs, provision of vocational information, and occupations classes are some of the methods examined and evaluated. Placement problems, vocational maladjustments, and the guidance of physically or mentally handicapped children are other subjects to which chapters are devoted.

Part III deals with the selection of suitable counselors and their training. The counselor's job is analyzed, also her relations to parents and to other workers in the school. The possibility of uniting counseling with other duties, such as those of the dean, is considered. Administrative problems in the organization of vocational guidance and placement service are given some attention.

Part IV outlines specific plans for vocational guidance in different types of schools, rural and urban.

Of the book as a whole, it may be said that it shows how extensive is Professor Brewer's background and how competent his knowledge of actual conditions. It is well adapted to teaching purposes, because it encourages the student to do real thinking. The method in general is the presentation of concrete situations, followed by pertinent questions for discussion or written reports. It is not, in the reviewer's opinion, a book of the fool-proof type, to be used by an instructor not thoroughly familiar with the subject. But in the hands of a well-informed and skillful teacher, it should be an excellent text. Without such competent leadership, a class might go astray in their consideration of the questions raised for debate; with it, a high order of group discussion should be attained.

VOCATIONAL GUIDANCE OF LITTLE BOYS AND OTHERS

Today's A B C book. By Elizabeth King. New York: Robert M. McBride & Co., 1929. Pp. 52.

The job guide for seniors, vocations for every graduate. By G. P. Manning, Chicago: Woman's World Press, 1929. Pp. 47.

What'll you do when you grow up? By Berta and Elmer Hader. New York: Longmans, Green & Co., 1929. Pp. 52.

Reviewed by Douglas Fryer

The little boys and girls are asked to find themselves, and the college senior pokes fun at his own attempts to reach a satisfactory vocational adjustment.

Some little boys, who turn the pages of magazines, are seizing upon pictures of automobiles and other mechanical objects. In *Today's A B C Book*, by Elizabeth King, they will find massive but unimaginative pictures of a dredge, a steam-shovel, a tractor, a zeppelin, with brief pedantic descriptions (supposedly to be read by father in the rôle of vocational counselor) illustrating all of the twenty-six letters of the alphabet. This little book may fill a guidance need to stimulate the beginnings of vocational thinking in the child of three and four, but the reviewer thinks a father could do better with a copy of *Popular Mechanics*.

The *Job Guide for Seniors* is a collegiate satire upon more than one thing: upon the vocational difficulties of the college man, upon the over-seriousness of youth struggling to climb the vocational ladder along with the Schwabs and Harrimans, and upon the attempts of vocational psychologists to produce a system which will assist the college man in this endeavor. The book has all the trappings of a manual of vocational guidance, with case histories and "Glossary of Golden Opportunities" and with descriptions of occupations from plumber to "home boy," all of these dripping with "college humor."

What'll You Do When You Grow Up is a legitimate attempt in junior guidance at the age of four or five years. It combines humor and information in poetry and picture, and if the process of vocational guidance can be standardized for the little tot, here is something that may be useful to the fathers and mothers who have become imbued with the spirit of vocational guidance in the home.

BRIEFER MENTION

Publications of the American Sociological Society, Vol. XXII: The Relation of the Individual to the Community. Ernest W. Burgess, Editor. Chicago: University of Chicago Press, 1928.

This collection of papers and abstracts, which was delivered at the twenty second annual meeting of the American Sociological Society, (1927), summarizes researches upon the relation of the individual to the community. A paper by W. I. Thomas directs attention to behavior patterns, and to behavior forming situations, and appeals for a more thorough-going exploration of each in relation to the other. Arthur Evans Wood criticizes the community center movement and asks for morally and intellectually satisfying provisions in its program. In his analysis of the concepts of "group" and "institution," Floyd Allport thinks that the whole may be either greater or less than the sum of its parts. Dwight Sanderson observes that the farmer is losing his sense of inferiority and is mingling at par with town residents; while John M. Gillette regrets that the countryside is being socially devastated by modern machinery. According to Lawrence H. Frank, a group is organized when each member acquires a patterned way of responding to other members. The personality of persons in mixed blood groups develop along somewhat divergent lines, is the view of E. B. Reuter. Frank H. Hankins, however, believes that personality develops according to internal energies, predispositions and response tendencies, rather than through the influence of the social milieu. Organized society is possible, according to C. M. Child, because of the biological nature of the individual. Magic, in the view of L. L. Bernard, arises from the attempt of one person to impose his will upon others. Abstracts of papers which have previously appeared in other numbers of the Journal of Sociology also are included, making a bulky volume.

Citizenship in the industrial world. By G. A. Johnston. London: Longmans, Green and Company, Ltd., 1928. Pp. 292.

The philosophy of industrial relations engages the attention of the author of this book, a question is raised for answer. When the loyalty of a citizen is drawn now to the state, now to his industrial position, to his church, or his family, or his club,—which shall be the most important loyalty?

Nearly every citizen is consumer and producer and thus in conflict with himself. Thereby he becomes a citizen, judging for the mass of citizens, and the average judgment will balance the various loyalties. If the general attitude of the citizen in formulating his action be that of sharing, rather than that of putting something over, then the way of peaceful settlement of industrial disputes will accord with good citizenship. The citizen has many loyalties, and his citizenship is to be measured by the technique which he uses to balance the various claims upon him.

Psychology from the standpoint of a behaviorist (3d edition, revised). By J. B. Watson. Philadelphia: J. B. Lippincott Co., 1929. Pp. 458.

This book gives the objective evidence for the author's behavioristic system. As in the previous editions there is an exhaustive treatment of the mechanisms of stimulation, of the integration by the organism, and of the responding activity. The hereditary modes of behavior are the emotions and instincts. Habits are both implicit and explicit. Thinking is a learned implicit reaction. Personality is the "reaction-mass," of which the largest component consists of clear-cut and definite habit systems.

A theoretical basis of human behavior, (2d edition, revised). By A. P. Weiss, Columbus, O.: Adams, 1929. Pp. 479.

Human behavior is a form of motion. The individual is a locus in the movement continuum. Every movement within the individual is a mathematical function of all past and future motions in the universe. These are essential postulates of Weiss's psychological system, in which he attempts to analyze human behavior into biophysical and biosocial stimuli and to catalogue the responses to these stimuli. "Behaviorism is the science that studies the origin and development of those bodily movements (responses) of the individual which establish his status in the social organization of which he is a member."

A comparative study of certain incentives in the learning of the white rat. By E. M. Ligon, *Comparative Psychology Monographs*, No. 2, VI, Baltimore: Johns Hopkins Press, 1929. P. 95.

This is a study of motivation under experimentally controlled conditions, with rats as subjects. Hunger (physiological S), presence of another rat (social S) and a buzzer (physical S) were used as incentives. All three stimuli were found to be incentives to heightened activity in rats. The subjects were most active with the hunger stimulus six hours after feeding. Rats running the maze to another rat in the food-box were generally driven to greater activity. In a revolving cage rats were most active in turning the cage six hours after feeding. The learning problem is found to be the best method of measuring motivation in rats.

Bodily changes in pain, hunger, fear and rage (2d edition, revised). By Walter B. Cannon, New York: D. Appleton & Co., 1929. P. 404.

The essential physiological explanation of the emotions is found in the functioning of the adrenal glands which are activated by the splanchnic nerves from the spinal cord. Adrenal secretion is secreted into the blood stream during strong emotions or pain. Adrenin causes blood sugar to be secreted from the liver to be used as a source of muscular energy and as an antidote to the effects of fatigue. The heart is accelerated, blood pressure is increased at the periphery of the body. Digestion is stopped. When in contact with the air the blood coagulates more rapidly under the action of adrenin. All of these bodily changes take place during emotional excitement and are regarded as a preparation to heightened activity.

A selected bibliography of child development. Paul H. Furfey, Washington: Catholic Education Press, 1929. P. 51.

Selected references, classified under physical growth, anatomical and physiological age, intelligence, speech, relation of physical and mental growth, infancy, preschool child, the school period, adolescence, and other topics, survey the accumulation of scientific knowledge upon the child during the last twenty-five years.

Proceedings of the first colloquium on personality investigation. Towson, Md.: The American Psychiatric Association, 1928. P. 102.

A group of psychologists, sociologists and psychiatrists gathered to discuss the possibility of arriving at a common understanding as to terminology and techniques in the study of personality. There was general agreement as to the desirability of mutual understanding. The variety of points of view which were presented, however, offered little in the way of concrete suggestions as to ways in which mutual exchanges of fundamental information could be brought about. A plea was made for quantitative formulation of results of examinations or surveys and especially for the establishment of a norm previous to generalization. The colloquium adjourned without definite action.

Introduction to the study of educational and occupational opportunities. Albany: University of State of New York, Bulletin No. 931, 1929. Pp. 46.

This is a syllabus of a year course for Grade 7, or thereabouts, of a junior high school, which is offered to assist pupils in orientating themselves as to educational and vocational opportunities and to develop habits of mental work. A brief discussion, with exercises and references, accompanies each topic, some of which follow: "New Things You Have To Do," "How You Can Succeed in School," "After School—Your Next Step," "What You Know or May Learn about Occupations," "What Kind of Training Does Your School Have to Offer You," "The Next Step in Your Education."

The general shop. By Louis V. Newkirk and George D. Stoddard. Peoria, Ill.: Manual Arts Press, 1929. Pp. 187.

This volume gives a survey of some of the problems which will concern teachers of shop courses in public schools. Some original tests of pupil learning are given and the project method is emphasized. Throughout it is recognized that each pupil must do his own learning, and that therefore instruction must be individualized. The types of jobs which pupils should be able to do after a course in The General Shop are to replace a window pane, solder a pan, read the electric meter, clean a clogged drain pipe, paint a board, set hinges, sharpen a knife, test and care for storage battery, and other tinker jobs of a similar sort.

New Books

VOCATIONAL INFORMATION

CASEY, CHARLES C. *The way to more productive selling.* New York: McGraw Hill Book Company, 1929. 157 p. $2.00.

GIRRIEL, STEWART W. *The dignity and romance of the painting craft.* Cleveland, Ohio.: William Feather Company, 1929. 94 p. Apply.

KITSON, HARRY DEXTER. *How to find the right vocation.* New York: Harper & Brothers, 1929. 212 p. $2.50.

KUH, CHARLOTTE. *Happy hour books.* Evanston, Illinois: Row, Peterson & Company, 1929. 50¢ each.

McCALLUM, JANE Y. *Women pioneers.* Richmond, Virginia: Johnson Publishing Company, 1929. 251 p. $1.25.

McCORMICK, THOMAS CARSON. *Agriculture for rural teachers.* New York: Macmillan Company, 1929. 402 p. $1.80.

PITKIN, WALTER BOUGHTON, AND HUGHES, HAROLD F. *The young citizen at work and at play.* New York: D. Appleton & Company. 1929. 219 p. $1.00.

SMITH, F. R. *Bookbinding.* New York: Isaac Pitman and Sons, 1929. 127 p. Bds. $1.00.

STEVENSON, JOHN ALFORD. *Salesmanship.* Chicago, Illinois: American Library Association. 30 p. 50¢. Paper 35¢.

STOCKWELL, HERBERT GRANT. *Introduction to business management.* New York: Harper & Brothers, 1929. 290 p. $4.00.

WARREN, CARL N. *News reporting.* New York: Harper and Brothers, 1929. 277 p. $2.25.

INDUSTRY

BEZANSON, ANNE. *Help-wanted advertising as an indicator of the demand for labor.* Philadelphia: University of Pennsylvania, 1929. 116 p. $2.00.

FLINN, ALFRED D., comp. *Popular research narratives.* Baltimore, Maryland: Williams & Wilkins Company, 1929. 180 p. $1.00.

HARING, CHESTER E. *The manufacturer and his outlets.* New York: Harper & Brothers, 1929. 202 p. $3.00.

McGarry, Edmund D. *Retail trade mortality.* Buffalo, New York: Bureau of Business & Social Research, University of Buffalo, 1929. 67 p. $1.25.

Popkin, Martin E. *Organization, management and technology in the manufacture of men's clothing.* New York: Isaac Pitman & Sons, 1929. 414 p. $10.00.

Richards, Charles Russell. *Art in industry.* New York: Macmillan Company, 1929. 499 p. $2.50.

PSYCHOLOGY

Brown, Ancil T. *Energizing personality.* New York: McGraw Hill Book Company, 1929. 160 p. $2.00.

Fisher, Vivian Ezra. *An introduction to abnormal psychology.* Macmillan Company, 1929. 522 p. $2.60.

Hollingworth, Harry Levi. *Vocational psychology and character analysis.* New York: D. Appleton & Company, 1929. 419 p. $3.00.

EDUCATIONAL

Baker, Harry Jay. *Educational disability and case studies in remedial teaching.* Bloomington, Illinois: Public School Publishing Company, 1929. 182 p. $2.00.

Burton, William Henry. *The supervision of elementary subjects.* New York: D. Appleton & Company, 1929. 729 p. $2.40.

Caswell, Hollis Leland. *City school surveys.* New York: Teachers College, Columbia University, 1929. 136 p. $1.50.

Cobb, Walter Frank, M.D. *Values and methods in health education.* Evanston, Illinois: Row, Peterson & Company, 1929. 378 p. $2.00.

Haefner, Ralph. *The educational significance of left-handedness.* New York: Teachers College, Columbia University, 1929. 92 p. $1.50.

Kandel, Isaac Leon, ed. *Educational yearbook of the International Institute of Teachers College.* New York: Teachers College, Columbia University, 1928. 478 p. $3.50.

McDaniel, Clara LaTourette, and McDaniel, Charles F. *Superior typewriting instructor.* Cedar Rapids, Iowa: McDaniel Publishing Company, 1929. 85 p. $.90.

Murray, A. Victor. *The school in the Bush.* New York: Longmans, Green & Company, 1929. 433 p. $5.00.

Myers, Alonzo F. and Harshman, Floyd E. *Training secondary-school teachers.* New York: American Book Company. 1929. 245 p. Paper. $1.32.

O'Shea, Micheal Vincent. *Newer ways with children.* New York: Greenberg Publisher, Inc., 1929. 428 p. $3.50.

Sayers, Ephraim Vern. *Educational issues and unity of experience.* New York: Teachers College, Columbia University, 1929. 120 p. $1.50.

Smith, Hilda Worthington. *Women workers at the Bryn Mawr Summer School.* New York: American Association for Adult Education, 1929. 363 p. Paper. $1.50.

The students speak out. New York: New Republic, 1929. 269 p. Paper. $1.00.

Whitford, William G. *An introduction to art education.* New York: D. Appleton & Company, 1929. 354 p. $2.25.

HEALTH

Elkind Henry. *The healthy mind.* New York: Greenberg Publisher Inc., 1929. 269 p. $3.50.

Hammar, Park G. *Growing young and staying young.* St. Louis: Author, 611 Olive Street, 1929. 122 p. $5.00.

Holck, Harold H. G. *Diet and efficiency.* Chicago, Illinois: University of Chicago Press, 1929. 81 p. Paper. Apply.

McCollum, Elmer Verner and Simmonds, Nina. *The newer knowledge of nutrition.* New York: Macmillan Company, 1929. 606 p. $5.00.

ECONOMICS

Angell, Norman. *The story of money.* New York: Frederick A. Stokes Company, 1929. 427 p. $5.00.

Seager, Henry Rogers and Gulick, Charles Adams, Jr. *Trust and corporation problems.* New York: Harper and Brothers, 1929. 731 p. $3.50.

Shearman, Henry P. *Practical economics.* New York: McGraw-Hill Book Company, 1929. 464 p. $3.00.

Toulmin, Harry Aubrey, Jr. *Million in mergers.* New York: B. C. Forbes Publishing Company, 1929. 338 p. $3.50 Bds.

SOCIOLOGY

Baldwin, J. W. *The social studies laboratory.* New York: Teachers College, Columbia University, 1929. 104 p. $1.50.

Lundberg, George A. and Others, eds. *Trends in American Sociology.* New York: Harper & Brothers, 1929. 455 p. $3.00.

Lawrence, David. *The other side of government.* New York: Charles Scribner's Sons, 1929. 297 p. $2.00.

Titus, Charles Hickman and Harding, Victor Hunt. *Government and society.* New York: F. S. Crofts & Company, 1929. 250 p. $2.75.

PHILOSOPHY

Harvey-Gibson, Robert John. *Two thousand years of science.* New York: Macmillan Company, 1929. 369 p. $4.00.

Hatfield, Henry Stafford. *The conquest of thought by invention.* New York: W. W. Norton, 1929. 80 p. $1.00.

Current Periodicals

Prepared by Linda H. Morley, *Industrial Relations Counselors, Inc.*

ACCIDENTS—STATISTICS

Grieve, G. G. (Assistant Statistician, National Safety Council). Serious industrial accidents decline, 1926–1928. *National Safety News*, December 1929, Vol. 20, 21–22.

Includes tables of frequency and severity rates.

AGE

Employment age limitations. *Bulletin of the Taylor Society.* October 1929, Vol. 14, 222–228.

Abstract of discussions at a meeting of the Eastern Massachusetts Section of the Taylor Society, Boston, April 5, 1929. Paper presented by director of statistics of the Mass. Dept. of Labor and Industries, gives tables showing that for males as well as females proportionately more older than younger applicants are placed by state employment bureaus.

Report by the Employment Relations Committee (National Association of Manufacturers). *American Industries*, Oct. 1929, Vol. 30, 61–63.

Summary of investigation of hiring limits made by the association.

ARBITRATION

Results of arbitration cases involving wages and hours, 1865 to 1929. *Monthly Labor Review*, Nov. 1929, Vol. 29, 1052–1058.

Shows that of all such cases of which the U. S. Bur. of Labor Statistics has record 70 per cent were in favor of workers, 26 per cent in favor of employers and 4 per cent mixed.

COST OF LIVING

Cost of living of federal employees in five cities; part 3: miscellaneous expenditures. *Monthly Labor Review*, Oct. 1929, Vol. 29, 1013–1026.

Thirty-one items are covered for 9 income groups, from less than $1,500 to $3,600 and over, showing average expenditure per family for each. This report supplements the previous reports giving a general analysis of income and expenses, surplus and deficits, and food consumption and costs.

Cost of living of federal employees in five cities; part 3: installment buying. *Monthly Labor Review*, Nov. 1929, Vol. 29, 1039–1048.

Shows the amounts involved and kinds of instalment purchases made, by income groups, in Baltimore, Boston, Chicago, New York, and New Orleans. Separate tables show average amounts paid off during current year and amounts due at end of year.

ECONOMIC CONDITIONS—SOUTH

Mitchell, Broadus. Why cheap labor down South? *Virginia Quarterly Review*, Oct. 1929, Vol. 5, 481–491.

General statement of conditions, with a brief historical introduction.

EMPLOYMENT DEPARTMENT

Trimmer, H. M. Facilities for personnel work. *Architectural Forum*, Sept. 1929, Vol. 51, 399–404, part 2.

FATIGUE

Johnson, H. M. (Mellon Institute of Industrial Research, University of Pittsburgh). Real meaning of fatigue. *Journal of the National Institute of Industrial Psychology*, Oct. 1929, Vol. 4, 433–445. (Reproduced from *Harper's*)

Nature of fatigue; nervous and mental fatigue; fatigue toxins; asphyxiation, narcosis and fatigue; intoxication and fatigue; stimulating effect of slight fatigue; impairment of finer adjustments; disorders of speech; disorders of attention; reduction of scope of attention.

HOURS OF LABOR

Frain, H. LaRue (Industrial Research Department, University of Pennsylvania). Some observations concerning the assumption of normal working time. *Journal of the American Statistical Association*, Sept. 1929, Vol. 24, 276–287.

Suggests that in connection with wage discussions the expression "normal working time" may require more careful definition than it often receives. While surface indications suggest, and the aggregate results confirm, marked similarity of actual and normal time, it may still be incorrect to infer that this similarity is representative of the particular situations which give rise to the aggregate conditions. Certain possibilities are cited.

Robbins, Lionel (New College, Oxford). Economic effects of variations of hours of labour. *Economic Journal*, Mar. 1929, Vol. 39, 25–40.

Some conclusions: that which dimimishes the prospect of income for society diminishes it also for the individual; although when certain conditions are not present, this is not so for groups of individuals acting concertedly; and there is nothing in the general theory to justify the belief that diminutions in hours which do not increase efficiency will tend to raise general wages, or that increases which do not diminish efficiency will tend to lower them.

INCENTIVES

Alden, C. R. (Research Engineer, Ex-Cello-O-Tool & Manufacturing Company) and Lytle, C. W. (Director, Industrial Coöperation, New York University) Incentives for creative workers. *Mechanical Engineering*, Aug. 1929, Vol. 51, 628–629.

Policy of the Ex-Cello-O-Tool & Manufacturing Company in regard to patentable ideas.

Lytle, C. W. (Director of Industrial Cooperation, New York University). Wage incentives for direct labor. *Mechanical Engineering*, July 1929. Vol. 51, 493–502.

Ideals for extra financial incentives. The ten plans found by analysis to meet all requirements for direct-production work. Example illustrating analytical method employed. Digested from a forthcoming book by the author, covering the whole field of remuneration.

INDUSTRIAL RELATIONS

Morehouse, E. W. Background of labor relations of public utilities. *Journal of Land and Public Utility Economics*, Aug. 1929, Vol. 5, 275–284. Nov. 1929, 412–423.

JOB ANALYSIS

Bergen, Garret Lawrence (Central Personnel Department, Irving Trust Company). Uses of job study. *Personnel*, Nov. 1929, Vol. 6, 85–100.

Points out the benefits consequent to the conduct of a job study. Job analysis, position classification and position specification are noted as the three major phases of a job study. Each is broken down into its component parts.

LABOR PRODUCTIVITY

Schwartz, G. L. Increased output per head in industry in the United States and the United Kingdom. *Economic Journal*, Mar. 1929, Vol. 39, 58–62.

Supplementary calculations based on U. S. Census, which was not available when the original study was published, as memorandum no. 6 of the Royal Economic Society.

PERSONNEL MANAGEMENT

Civil Service Assembly of the United States and Canada. Summary of the proceedings of the twenty-second annual meeting. *Public Personnel Studies,* Sept.–Oct., 1929. Vol. 7, entire issue.

Reports of the following sections and committees are covered: Technical section on the organization of the administrative units of a government; technical section on coöperative action with civic organizations; technical committee on training courses; technical committee on classification and compensation plans; technical committee on recruiting for scientific positions; technical committee on layoffs and reëmployment.

SALARIES

Gates, A.B. (Assistant Manager, Industrial Relations, Commonwealth Edison Company, and Vice-Chairman, A.M.A. Salary Administration Group). Salary administration; report of dinner meetings of A.M.A. salary administration group. *Personnel,* Nov. 1929, Vol. 6, 71–84.

Fundamental theory underlying centralized salary administration and problems that have arisen in the working out and operation of such administration in various company organizations.

SCIENTIFIC MANAGEMENT

Frankel, S. H. Rationalization of industrial system. *Social and Industrial Review,* Oct. 1929, Vol. 8, 901–907.

Johnston, G. A. (Chief of Section, Intelligence and Liaison Division, International Labour Office). Rationalisation and industrial relations. *International Labour Review,* Nov. 1929, Vol. 20, 619–640.

STANDARDS OF LIVING

Woodhouse, Chase Going (U. S. Bureau of Home Economics). Standard of living at the professional level, 1816–1817 and 1926–1927. *Journal of Political Economy,* Oct. 1929, Vol. 37, 552–572.

Comparison between actual account books of these two periods, of two families in similar circumstances.

SUGGESTION SYSTEMS

Employee suggestion systems stimulate ideas. *Aera,* June–July, 1929. Vol. 20, 324–328, 388–391.

TESTS

O'Rourke, L. J. (Director of Personnel Research, United States Civil Service Commission). Use of scientific tests in the selection and promotion of police. *Annals of the American Academy of Political and Social Science,* Nov. 1929, Vol. 146, 147–159.

Brief summary of reports submitted by thirty of the sixty largest cities, with a few critical remarks based on findings of research which the U. S. Civil Service Commission has conducted for the purpose of improving police selection.

TRAINING—APPRENTICES

Freund, C. J. (Apprentice Supervisor, Falk Corporation). Making of a modern machinist; how the Falk Corporation trains young men for the machine shop industry under the Milwaukee apprenticeship plan.

Machinery, July 1929, Vol. 35, 801–806.

Details of the plan of this company. Profusely illustrated.

Prentiss, F. L. (Resident Editor, *Iron Age,* Cleveland). Apprentice training pays dividends. *Iron Age.* Nov. 14, 1929. Vol. 124, 1293–1298.

New high standards result in developing young men for responsible executive and technical positions. Warner & Swasey training school.

Szepesi, E. Scientific apprentice training in fullfashioned hosiery mills. *Melliand,* June 1929. Vol. 1, 366–372.

TURNOVER

Berridge, William A. (Metropolitan Life Insurance Co.). Measuring labor turnover. Personnel Journal, Oct. 1929, Vol. 8, 197–206.

A report of progress on the labor turnover study undertaken by the Metropolitan Life Insurance Company in 1926.

UNEMPLOYMENT

Snow, E. C. (M.A.; D.Sc.). Limits of industrial employment. *Journal of the Royal Statistical Society*, 1929, Vol. 92, part 3, 323–357.

Relation between population growth and unemployment stressed. Scholarly article.

UNION MANAGEMENT COÖPERATION

Beyer, Otto S., Jr. (Consulting Engineer Railway Employees' Department, American Federation of Labor). Machinery of coöperation. *American Federationist*, Nov. 1929, Vol. 36, 1311–1319.

Canadian National Railways system of union management coöperation.

WAGES

Clay, Henry (University of Manchester). Public regulation of wages in Great Britain. *Economic Journal*, Sept. 1929. Vol. 39, 323–343.

"My object in this review of wages and employment has been to discover the consequences of the change in methods of settling wages."

Frain, H. LaRue (Industrial Research Department, University of Pennsylvania). Length of service and wages. *Monthly Labor Review*, Oct. 1929, Vol. 29, 789–797.

Shows that, in general, average hourly earnings tend to increase quite markedly as length of service increases.

International Labour Office. Comparison of real wages in various countries. *International Labour Review*, Oct. 1929, Vol. 20, 580–588.

Includes tables covering 44 cities in 12 countries. Thirty trades are included and the figures are as of July, 1929. Another table gives average retail prices of 39 articles of ordinary consumption in 14 countries.

WAGES—PAYMENT METHODS

Hathaway, H. K. (Counsulting Engineer, New York). Incentive wage systems. *Bulletin of the Taylor Society*, Oct. 1929. Vol. 14, 196–205.

With particular reference to the Gantt task and bonus plan which the author considers in all respects the most satisfactory for any plant operated under a system of scientific management. The effect on management is to his mind of greater importance than is the incentive to the worker, because of the necessity for clearly defined methods and conditions, which is also a preventive of misunderstandings to which most labor troubles are due.

Koltzsch, M. J. Methods of paying driver salesmen; a survey of incentive wage plans employed by 21 concerns in 7 different vocations. *Commercial Car Journal*, Oct. 1929, Vol. 38, 26–28.

Trades covered are: laundry; ice cream; beverage; milk; bakery; meat; rolling grocery store. Shows type of wage: salary and commission; extra bonus; straight salary. Average weekly income and range of income are also given.

Personnel Research in the Y. M. C. A.[1]

Progress on a Five-Year Program

By Owen E. Pence, *National Council Y. M. C. A.*

Mr. Pence, who presents this enheartening survey of researches recently completed and in progress in various branches of the Young Men's Christian Association, is Secretary for Research in the Personnel Division of the National Council of the Y. M. C. A.

IT IS my purpose briefly to present the experience which one organization has been passing through in its attempt, during recent years, to apply some of the modern scientific methods of personnel study to its own problems. The statement will probably err on the side of being too comprehensive. But I shall try to present a survey of our personnel situation in quite specific terms, to point out some of the plans which were set up to meet it, to indicate something of the progress made, and finally to refer to some of the problems of coöperative personnel study which we have encountered. A later speaker will present in detail certain of the specific studies now in progress or completed.

It is sometimes said that institutions are perhaps more concerned with perpetuating their status than with facts, favorable or unfavorable, which might abridge the scope of their functions. Whether this is typical of all institutions, or of any group of them, I do not know. In speaking for one social-religious organization, apart from any religious implications which may be involved, it would seem that institutions of whatever type probably have this much in common: that they tend to perpetuate their structure and procedures without giving adequate emphasis to the individuals involved; —and that in general their personnel problem is the problem of rediscovering the person, and reconstructing both structure and procedures around his welfare and growth. That, it would seem, was the essential significance of many of the reports presented yesterday, and of last night's exceptional addresses. Even the institution of government was seen to be no exception.

Personnel research among the social and religious agencies is relatively new, much more recent, no doubt, than in the case of either education or industry. In presenting the experience of one organization, there is of course no attempt to speak for all similar types of organization, nor to imply that what has been done up until now may be applied fruitfully elsewhere. The Y. M. C. A. has however profited greatly from its membership in the Personnel Research Federation for the past three or four years, and from meetings similar to these. We have found that we have very much to learn from personnel studies both in industry and in education, and have to some extent borrowed techniques and applied them to our own problems. It may not be assumed however that the problems are altogether similar, and that fundamental adaptations are not sometimes necessary.

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[1] Read at the Annual Fall Conference of the Personnel Research Federation, November 16, 1929.

If personnel research is new among social and religious agencies, the problem itself is not new. Such organizations have their own problems of selecting and training their own professional leadership, and in achieving efficient personnel administration. Because of public or semi-public support, and for many other reasons such organizations have long had abundant reason to attempt to find suitable measures of their productivity.

The research activities of the Young Men's Christian Association involve many fields, such as character measurement, methods of character education, building science, problems of administration and finance, and not least of all, the personnel problem. It is the purpose of this report briefly to review activities in the latter fields.

Personnel research in the Y. M. C. A. has been definitely under way for about three years. At this time it is possible to review some of the progress made and to point out the general direction of effort for the next two years of the initial five-year period. In this organization personnel research includes the activities of the Personnel Division itself, with which I am connected; the three Colleges which offer professional training for the Association secretaryship, a fuller report from one of which will be given later; and to some extent, the local Associations, especially those in larger cities. The Y. M. C. A. unites some 1500 autonomous local societies, 1134 of whom employ secretaries, 5000 in number. The principle of democracy controls policy and relationships in this organization. It implies coöperative research at many points and a tendency to somewhat widespread participation of individuals in various phases of fact-finding. A newly developed "Conference on Research" has served to unify these interested workers and to help toward the improvement of techniques and the determination of objectives. (Simply an annual gathering of those responsible for direction of research activities.) In this kind of situation, it has been the policy of the Personnel Division to secure the coöperation of various other agencies and persons throughout the entire Movement, including the three training colleges, and to utilize their resources in the study of specific problems. The Division itself undertakes major studies which cannot be provided for in other ways.

Three years ago, when our principal efforts in personnel study were begun, we were very conscious of certain problems. Many others, some of them much more subtle than obvious, have emerged as we have worked. We had a central record system upon the 5000 secretaries, but it was quite inadequate. We were selecting several hundred new secretaries each year, but this being done altogether locally and without coördination, the results were not satisfactory. We had the usual problems of high turnover, initial placement, transfer between associations, positions, and terminations. We had all of the many salary problems. We were aware that no adequate measures of achievement were available, and that human appraisal was largely upon a subjective and unsound basis. We had no means of studying, measuring, and stimulating professional growth. We had developed a successful Retirement Fund, from which secretaries might receive normal benefits at the age of sixty, but we were uncertain as to its exact effects, either as to stabilization of the profession, which was its original purpose, or as to delaying the termination of less capable secretaries. We were including in our officially recognized roster of secretaries an altogether indiscriminate group, undifferentiated as to age, probation or vestibule experience, educational background, and many other points. But we had this asset,—that in the course of a considerable reorganization of our national structure some five years since, a Personnel Division was included as a major feature of the plan. On the basis of this specific indication of a desire to improve the personnel situation, without knowing exactly what was involved, definite studies were begun. I shall hastily run over some of the progress which has been made in the short three year period. From these can be seen also some of the main lines of our further efforts.

POSITION STUDIES

Studies centering in the definition of the Secretaryship have received major attention. These include two significant studies of the functions of the Executive Secretary and the Physical Director, by Association College, Chicago, which have just been published by the University of Chicago Press. These studies follow the well-known Charters technique and represent extensions of it in certain respects, particularly in the method of deriving specific units for professional training. Further studies in this area include Personnel Division staff studies of promotion patterns; activity studies and the preparation of specifications for secretarial positions; statistical studies of the Physical Directorship and the Boys' Work Secretaryship; turnover studies of the usual type; the development of percentile salary scales differentiated by age, tenure and size of city; the preparation of critical scores based on personal history and service records for prediction of success; and finally, coöperative study of factors determining salaries at the professional level and the Personnel Division and Association College, Chicago.

TRAINING STUDIES

Some critical studies of the pre-service and in-service education of the Association secretaries have been completed and others are in progress. The Personnel Division has concluded an Educational Inventory of the academic experience and adult educational activities of more than two thousand of our employed secretaries. The study reveals an unexpected amount of continuation education of various kinds going on after employment as a secretary, this continuous education being somewhat more characteristic of those who enter with complete college equipment than with other groups.

The activity studies of Association College, Chicago, referred to above, provide exceedingly important new material for the preparation of a specific curriculum based on "teachable units of experience" derived from current practice.

Another study by the Division which approaches completion makes a careful analysis of the procedures of some fifteen local secretarial staffs with a view to discovering the nature of the professional experience of the individual secretary as a staff member and the significance of the staff as an educational factor affecting his professional growth. The techniques include a statistical history of the staff, current statistical analysis of the staff, work analysis, standardized interview, both individual and group, and a check list on staff morale, another on interest, a satisfaction rating, a group community analysis, group rating on social awareness, critical discussion of patterns of staff procedure, a report on practices used in selecting new secretaries and finally a standardized observation report of four to six local staff meetings.

Another coöperative educational study includes a survey of the property, operation, personnel, field relations and educational procedures of nine Summer Schools for secretaries which annually enroll approximately one-fifth of the five thousand employed officers of the organization. This survey through the past three years involves adjustments made necessary by changing conditions in American life, which affect Summer educational institutes located in isolation. It looks toward the adaptation of the best modern educational procedures which may be applicable to adult professional workers in short time schools.

SELECTION

About 500 new secretaries are selected each year by the local Associations independent of concerted effort. Special studies on the improvement of means of selecting secretaries are under way. The preparation of interest scales by Professor Edward K. Strong for Executive Secretaries, Physical Directors, and Boys' Work Secretaries has been completed and experimental application is going forward. A scale is to be developed for supervisory officers as well. These afford important new devices which are being given experimental use in Association College, Chicago, along with certain other means of *human appraisal* including, notably, some new indices of vital capacity. Tests of mental ability are being given in certain local staffs, in the three professional Colleges, and with some other groups. Emotional stability measurements, are included in some cases. The effectiveness of a "certifying" process, set into practice seven years ago, which is in force however only when local Associations so elect, is being studied in terms of continuity of service, rapidity of promotion and change in salary. Standards for certification are also being raised.

ACHIEVEMENT

Measurement of achievement is another project being actively pursued, especially in the Chicago Y. M. C. A., where units of reportable achievement on the job are being derived, given a score value and included in a success score, according to a technique which appears promising.

RECORDS

Despite the principle of autonomy resulting in independent local units, there has been voluntary agreement concerning central record keeping. A complete reorganization of the personnel records of the Movement is being approached experimentally. The three professional Colleges, six of the largest local Associations and the Personnel Division are uniting in a process of revision of record keeping around the effort to develop a cumulative achievement digest. An adaptation of the American Council folder has been developed on an experimental basis and is being given preliminary trial.

THE INTERVIEW

Interviewing occupies a prominent place in the activity of any secretary and an essential place in personnel functions. A standardized interview has been prepared and used in a preliminary way with some hundreds of secretaries in service in the course of certain local surveys. From a more intensive study of its shortcomings, in the course of its use with about 150 secretaries in the study of Staff Practice referred to above, a checking form for objective and comparable reporting has been prepared and is being given further trial. A less detailed interview form is used in connection with new entrants. The attempt is to develop a new diagnostic interview as an aid to better selection; and in addition an objective interview for guidance of the professional worker which may provide reliable basis for individual counsel both personally and professionally.

GUIDANCE

Among local Associations and notably in New York City, there has been a significant development of techniques of guidance as related to young men and boys in the membership. Three branches of the New York City organization and some in Chicago also, have been designated as experimental centers in which, under very competent leadership and with special grant of funds, various procedures of individual guidance, including testing and psychiatric measures in some cases, as well as the member-clinic, are being developed. Widespread interest in these developments and equally significant undertakings of a clinical character in Camden (Dr. Viteles), Boston (Dr. F. L. Wells), and certain other places point to the definite beginning of membership personnel work as an emphasis in Y. M. C. A. activity which may in time parallel the best of such work to be found in school and college.

VOCATION

Vocational problems are involved in all member activity programs. In the Boys' Work field extensive work of an exploratory character is being carried on by hundreds of local Associations, some of whom work closely with the school systems and have available the result of objective measures of all kinds. The Personnel Division has prepared a critical study of current philosophical positions with reference to their bearing upon the philosophy and psychology of work and the conception of vocation. Its attempt is to explore the philosophical basis of motivation and vocation and to prepare the way for the more objective type of research in the backgrounds of vocational adjustment.

SURVEYS

The local personnel survey has been sought by a number of the larger local Associations in conjunction with general surveys of Association work in the light of changing needs. New York City, Brooklyn, Worcester, Pittsburgh, Erie, Providence are among the cities. This experience is emphasizing the need for a critical re-study of survey techniques, including those applying more specifically to personnel surveys. Such study is being outlined by the Conference on Research (Y. M. C. A.) which has already made a preliminary reconnaissance study of the procedures used in all such attempts during the past year.

RELATED STUDIES

A related field as yet not always included in the purview of personnel research in that of character measurement and character education research. The Y. M. C. A. has a specific interest in this problem and can report a rapid extension of interest in the problem among local secretaries throughout the country. Under the guidance of a special committee of experts of which Dr. Goodwin Watson is Chairman, a series of character and personality tests has been assembled. The tests include the following, some of which represent new units which have been developed under the Program and Research section of The Home Division of the National Council, Y. M. C. A. and are published and distributed by Association Press, New York.

1. Advanced Bible Knowledge Test, Form A.
2. Laycock Test of Biblical Information, Form A.
3. Test of Religious Thinking (Advanced), Form A.
4. Test of Religious Thinking (Elementary), Form E.
5. Lehman's Play Quiz, Form A.
6. Test of Opinions on International Questions, Form A.
7. Opinions on Race Relations, Form A.
8. Gates-Strang Test of Health Knowledge, Form A.
9. Personal Attitudes Test for Boys, Form A.
10. How Do You Feel About It?

In various other fields of "program" operation are numerous studies which also have a very direct personnel bearing. Many of these relate to problems in vocational education in the United Y. M. C. A. schools, including both technical and character education problems.

Another group represents the physical approach. It may promise important personnel outcomes. Such are the anthropometric studies of Y. M. C. A. College, Springfield, Massachusetts; the research in physical exercise (including such factors as basal metabolism and intestinal motility) at Association College, Chicago; and other pioneer researches in physical education and the physiology of exercise by the Physical Section of the Home Division.

"Coöperative" education, combining work and study in various ways, is being given active experimental study in each of the three professional training colleges, and notably at Y. M. C. A. Graduate School, Nashville, where also some pioneer work in position specifications is being done.

RESEARCH AND PROFESSIONAL WORKMANSHIP

A word must be added on the growing interest among local and supervisory secretaries in research and studies of various kinds. A few larger cities are placing directors of research on their staffs. But even in smaller cities, some hundreds of men are listed by the Conference on Research because they have begun the critical study of their processes and the evaluation of their results Most of them are at work upon specific projects of a fact-finding and research character. The Conference on Research represents an attempt to foster this interest and to increase the quality of the work along with its increasing quantity. There is a frank facing of the problem of the relationship between technician and the practitioner; and a frank question as to whether there can be an absolute distinction between the two. The necessity for some long-time and large-scale researches well supported by special grants is clearly recognized, and the assignment of some special workers for these studies has been made. Their number will increase somewhat. On the other hand, the necessity of developing the research point of view among those who are contact secretaries, charged with executive and program responsibilities, seems not only good policy but necessary. In a democratic organization whose only organizational unity is that of a loose federation, circumstances are forcing the Association secretaries to practice coöperative self-criticism. Personnel Division while sensing the danger of superficiality and bias is taking the point of view that these can be avoided; and that it need not mean a loss of scientific objectivity. It further recognizes the close relationship of the growth of individual professional competence to this problem; and is centering its emphasis in secretarial education on the development of this more complete type of professional workmanship. In these different processes it has had the invaluable counsel and criticism of recognized leaders in industrial and educational personnel fields and gratefully acknowledges its debt. Levels of difficulty of studies are recognized, and professional guidance is sought sometimes through the use of specialists and more often through consultant relationships.

I wish finally to point out four problems of coöperative research, among others, which we have encountered in the course of our experience. Possibly these problems are somewhat accentuated by reason of our Movement's early decision to hazard its entire personnel future upon widespread mutual stimulation as against a highly centralized operation. Indeed no other policy was possible. But the problems cannot be traced wholly to this circumstance. Kindly bear in mind also that these problems interlock and suggest dependent solutions.

1. *We need a technique for getting an authentic consensus of crucial problems requiring study.*

This involves both the definition

of problems and the determination of objectives.

We have used various means for this purpose:

- a. the selection of major problems by an executive.
- b. the pressure of events and demands
- c. the following of lines of interest of investigators
- d. The tendency to follow "career" sequence
- e. the canvass of opinion

We are not satisfied with these processes.

Are there any definite techniques for determining what the crucial problems of a social-religious organization are? Or must we accept naïve judgments on this matter?

2. *We need some adequate means of integrating studies.*

Here are involved problems of comparability, over wide spread areas where frequent conference is not possible; and likewise are involved the means of assuring definite experimental controls. Also measures for the elimination of overlapping of work voluntarily undertaken by the several agencies within the Movement; and some kind of free polarization of these efforts.

We have thus far developed an annual review of all researches and studies even including those of very limited nature so far as we could learn of them, bringing these together in an annual summary, to be repeated this year in a more carefully edited volume as a kind of year-book. We are discussing plans for a critical and technical journal, in addition to the opportunities which come for the inclusion of various studies in other established publications. We have developed a Conference on Research for the accomplishment of some of these purposes and the definite upgrading of the quality of what is being done. We have drawn freely upon expert consultants.

But we still feel the need of accomplishing a better synthesis of all of these undertakings than we have yet achieved.

3. *We are much interested in the relationship between participation and application.*

This problem has been referred to in terms of the relationship between the technician and the practitioner. In some other types of study, there has been evidence of the work of some master mind apart from the process itself, a part of whose prestige doubtless rested in his supposed objectivity. We are concerned in the educational values which may come from each competent secretary doing appropriate kinds of study for the sake of what it will do to his thinking. We want to avoid the hiatus which often exists between the comprehensive studies of specialists, and the application of their results in practical measures. We are therefore aware that a certain field expectancy is being developed, which is an asset doubtless, so long as it does not impair thoroughness, or lead to impatience.

We have encouraged participation by many of our secretaries in various phases of fact-finding and in certain experimental work, use of tests, etc. We have given a few special courses in summer schools for increasing the preparation of individuals who have had sufficient basic preparation. We have sent a number into the universities for further specialized preparation.

We are concerned with competence in all research activities. Our problem is, how to extend the circle of those who are competent.

4. *We are concerned with the financing of coöperative studies.*

The basic question has to do with the relationship between what the field comes to want,—and what it can be brought to pay for. This problem intertwines all of the others. Our Associations are beginning to expect some important outcomes from the studies which have been begun. It is necessary that the annual budgets of the general Movement, and from time to time, of some of the larger local Associations, and clearly of our three professional training institutions, make ample allowance of funds for necessary studies.

On the whole, gratifying progress has been made in this matter during the past three years. But it continues to be a problem, especially in the difficult field of publication of the results.

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Turnover Among Deans of Women[1]

By Sarah M. Sturtevant, Ruth Strang, and Mary Hooton, *Teachers College, Columbia University*

How often do Deans of Women leave their positions, and why? The answers secured by Professor Sturtevant and her associates have value to young women considering such a career, and also to administrators who are aiming to make the deanship permanently attractive to able women.

The turnover rate of deans of women in 374 liberal arts colleges and universities and in 128 normal schools and teachers colleges was computed and the reasons for voluntary and involuntary separations studied.

The average rate of turnover in the liberal arts colleges was 14 per cent; in the teacher training institutions, 13 per cent. It is interesting to compare these per cents with the turnover rates in other vocations. The higher type of institution, as indicated by accrediting agencies, tends to have less turnover than the inferior type of institution located in small towns and requiring deans of women to carry heavy teaching loads.

The information obtained in this study is useful in estimating the probable number of positions available to qualified deans, and in suggesting some of the factors related to turnover in this vocation.

What was the turnover rate of deans of women in teachers colleges and normal schools during the years 1918–1928? What was the turnover in liberal arts colleges and universities? What differences between the two types of institutions were noticeable? What trends were disclosed during these years? What reasons for separations were most frequently given? How many of the replaced separations were voluntary? How many are involuntary on the part of the dean? How much of this turnover was unavoidable, i.e., due to illness, death, retirement, home conditions or marriage? How much was avoidable, i.e., due to dismissal, acceptance of better positions, dissatisfaction with the position, or change to another line of work? What were the characteristics of institutions having the largest amount of turnover during these years? How does the turnover of deans compare with the turnover in other fields?

Answers to these questions will be of interest to administrators who have had a large turnover and who desire to compare their institutions with other institutions in this respect; to vocational counselors who wish information concerning the average number of openings each year in the field of advisers of women and girls; and to prospective deans and deans in service who desire insight into possible openings for themselves.

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[1] Acknowledgment is made to Professor Harry D. Kitson for his helpful suggestions and criticisms.

SOURCES OF DATA

Data for answering these questions came from three sources:

1. Questionnaires sent to the presidents of 128 normal schools and four-year teachers colleges. These questionnaires asked for the name of the dean serving during each year from 1919–1927; the reason for leaving, whether voluntarily because of personal wish, or involuntarily at the request of the president or governing body; and additional comment on reasons for leaving which the president might be willing to give. These data were tabulated separately for the two types of institutions and also for the group as a whole, since qualitatively the characteristics of the two groups of teacher training institutions are not clearly defined.

2. Questionnaires to the presidents of 376 liberal arts colleges and universities for the years 1925–1927. These institutions were divided into three groups: Group I, approved by the Association of American Universities; Group II, approved by sectional accrediting associations; and Group III, non-accredited.

One hundred per cent returns to these questionnaires were received.

3. Catalogues of liberal arts colleges in Group I for the years 1918–1925.[2]

Cases of separation in which the dean returned to her position after a temporary leave of absence were not included among the separations for that year, nor in the tabulation of the reasons for leaving.

Since reasons for separations were stated on so few of the questionnaires returned by the liberal arts colleges, avoidable turnover rates were computed only for the teacher training institutions.

DEFINITION OF TERM

"Turnover" has been defined as,

(a) "The number of persons added to the staff or pay roll, within a given period—the number of additions."

(b) "The number whose employment is discontinued within a given period—the number of separations."

(c) "The number of persons leaving who are actually replaced—the number of replacements" (1).

In this study turnover is defined as in (c); and the rate of turnover expressed in per cent is obtained by dividing the total number of deans replaced by the total number of deans on pay rolls each year. This number of deans varies from year to year. In 1918–1919, for example, there were reported twenty normal schools having deans. This number gradually grew larger until by 1927–1928 there were thirty-six, an increase of sixteen positions during the ten years. Since there were only four colleges and one normal school in which the deans who left were not replaced, the number of separations is almost identical with the number of replacements.

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[2] These data were tabulated by Miss Blanche Howell, graduate student in the department of Advisers of Women and Girls, Teachers College, 1928.

TABLE 1

Turnover of deans of women in teacher training institutions and liberal arts colleges

YEAR	TEACHER TRAINING INSTITUTIONS									LIBERAL ARTS COLLEGES			TOTAL		
	Normal schools			Teachers colleges			Total			Group I			All institutions		
	Number of cases	Number of separations	Per cent turnover	Number of cases	Number of separations	Per cent turnover	Number of cases	Number of separations	Per cent turnover	Number of cases	Number of separations	Per cent turnover	Number of cases	Number of separations	Per cent turnover
1918–19	20	2	10.0	60	7	11.6	80	9	11.3	125	20	16.0	205	29	14.1
1919–20	21	5	23.8	63	6	9.5	84	11	13.1	128	18	14.1	212	29	13.7
1920–21	22	6	27.3	72	11	15.7	94	17	18.1	141	19	13.5	235	36	15.3
1921–22	21	4	19.0	73	15	20.5	94	19	20.2	144	20	13.9	238	39	16.4
1922–23	24	4	16.7	76	11	14.5	100	15	15.0	148	20	13.5	248	35	14.1
1923–24	27	4	14.8	84	14	16.7	111	18	16.2	153	23	15.0	264	41	15.5
1924–25	30	5	16.7	86	8	9.3	116	13	11.2	157	29	18.5	273	42	15.4
1925–26	33	4	12.1	90	5	5.6	123	9	7.2	151	15	9.9	500	64	12.8
1926–27	34	5	14.7	91	11	12.1	125	16	12.8	151	13	8.6	501	67	13.4
1927–28	36	5	13.9	92	4	4.3	128	9	7.0						
Average for ten years			16.4			11.7			12.9			13.5			14.3

RESULTS

The turnover rates for each group of institutions for the period of ten years may be read easily from table 1. Data were also obtained covering two years from the two other groups of liberal arts colleges previously described. These additional turnover figures are given in table 2. It will be noted that the average turnover rate for the teacher training institutions is almost the same as the rate for the liberal arts colleges and universities. The interesting differences are found within each of these two groups. The normal schools have a larger turnover than the teachers colleges and the non-accredited colleges than the accredited groups. This indicates a possible relationship between turnover and the standing of the institution. There seems to be a tendency for the four-year teacher training institutions and the accredited colleges to have the least turnover. This tendency may be due largely to fewer deans leaving the better institutions to obtain higher salaries or more prestige.

Although there are fluctuations in the rate of turnover from year to year, no definite consistent trends during the period of ten years are disclosed in any of the groups. The average rate for all groups does not vary more than three per cent from year to year. In teacher training institutions the turnover is noticeably large, in the years 1920–1921 and 1921–1922. In the

TABLE 2

Turnover of deans in Group II and III liberal arts colleges

YEAR	GROUP II			GROUP III			TOTAL		
	Number of cases	Number of separations	Per cent turnover	Number of cases	Number of separations	Per cent turnover	Number of cases	Number of separations	Per cent turnover
1925–26	117	13	11.1	109	27	24.8	377	55	14.6
1926–27	119	18	15.1	106	20	18.9	376	51	13.6
Average			13.1			21.9			13.8

TABLE 3

Causes of turnover among deans

CAUSES OF TURNOVER	1918–1928						1925–1927				
							Liberal arts colleges				
	Normal schools		Teachers colleges		Total teacher training institutes		Group I	Group II	Group III	Total	
	number	*per cent*	*number*	*per cent*	*number*	*per cent*	*number*	*number*	*number*	*number*	*per cent*
Number of cases reporting	44	100	92	100	136	100	5	12	24	41	38.7
Voluntary Separations	37	84.1	83	90.2	120	88.2	4	12	19	35	85.4
Involuntary Separations	7	15.9	9	9.8	16	11.8	1		5	6	14.6
Specific causes											
Number of cases reporting	37	84.1	53	57.6	90	66.2				23	21.7
Family Affairs	1		2		3			1		1	
Marriage	5		4		9			3	3	6	
Retired	3		2		5			1		1	
Death	2		2		4						
Ill Health	2		3		5			1	2	3	
Better Position	8		8		16		1		1	2	
Study, Travel	3		9		12			1	2	3	
Leave of Absence	1		2		3						
Temporary Substitutes	2		4		6						
Too Much Work (Combined Positions)			5		5				1	1	
Not Fitted for Work	4		8		12				2	2	
Change in Administration	1		4		5				1	1	
Mutual Consent									3	3	
Asked to Leave (Reason not stated)	5				5						

accredited Group I of the liberal arts colleges, on the other hand, there is no marked increase in the number of separations during these years but a high peak in 1924–1925. The reasons for these yearly variations in turnover are not disclosed by our data. The high turnover in teacher training institutions from 1920–1922 may be due to general post-war restlessness. But why deans in normal schools should be more restless than deans in liberal arts colleges is difficult to conjecture. It is impossible to tell whether the downward trend in Group I of the liberal arts colleges during the last two years is significant or not, because the questionnaire method of collecting data was used for the last two years, while the data for previous years were obtained from a catalogue study.

TABLE 4

Comparison between institutions having no turnover and those having a relatively large turnover

	INSTITUTIONS HAVING NO TURNOVER	INSTITUTIONS HAVING THREE OR MORE SEPARATIONS
Number of cases	23	14
Mean enrollment of School	1,014	543
Mean size of town or city in which School is located	56,493	5,898
Mean salary per month (1927)	$260	$240
Mean number of hours taught per week by deans	4	7
Number of deans not teaching	6	0

TABLE 5

Relation of turnover to salary

	NORMAL SCHOOLS	TEACHERS COLLEGES	LIBERAL ARTS COLLEGES		
			Group I	Group II	Group III
Median annual salary	$2,817	$3,136 (3)	$3,392	$2,556	$2,143 (4)
Turnover per cents	16.4	11.7	13.5	13.1	21.9

Table 3 gives the number of voluntary and involuntary separations and the reasons for leaving most frequently reported by the presidents. It is clearly evident that most deans,—88 per cent in teacher training institutions, and 85 per cent in liberal arts colleges,—leave of their own choice. They are not discharged from the institution. There are, however, cases in which the president frankly admits that a dean has been asked to resign from the institution. Teacher training institutions and liberal arts colleges differ little in this respect. There seems to be some indication that deans are asked to leave more often in normal schools than in teachers colleges; and in non-accredited, than in accredited institutions. It is interesting to note that Slichter (2) found in 78 industrial establishments that discharges constituted 12 per cent of all the terminations of employment. This corresponds almost exactly to the number of involuntary separations (discharge) found among deans of women in the teacher training institutions in this study.

It will be noted that the reasons for leaving most frequently reported are: to secure better positions, to study or travel, to engage in work for which the person feels that she is better fitted, and to get married.

TABLE 6

Rates of turnover in four vocations

KIND OF WORKER	YEAR	NUMBER OF CASES	NUMBER OF SEPARATIONS	PER CENT TURNOVER
1. Women employees of a large financial house in New York City (5)	1923	188	56	29
	1924	213	36	17
	1925	281	43	15
2. Teachers of the cities and villages of New York state (6):				
High School Teachers	1925–26	3,305½	509	15.40
Special Teachers	1925–26	591½	148	25.02
Principals	1925–26	746½	43	5.76
Supervisors	1925–26	610¼	30	4.92
3. Y. W. C. A. Secretaries (7)	1926	3,301	1,551	47
4. Deans of Women of the Teacher Training Institutions and Liberal Arts Colleges in the United States	1925–26	500	64	12.8
	1926–27	501	67	13.4
5. Psychologists	1920–24	2,143	169	7.9
Zoologists (8)	1920–24	1,706	79	4.6

The per cent of avoidable and unavoidable turnover in teachers colleges and normal schools was computed. In these institutions 71 per cent of the separations were avoidable, that is, due to dismissal, acceptance of better positions, dissatisfaction with position and change to another line of work. Twenty-nine per cent were classified as unavoidable, that is, due to marriage, illness, death, retirement because of age, and home conditions. The unavoidable turnover was ten per cent higher in normal schools than in teachers colleges.

In order to answer the question: "What are the characteristics of institutions having the largest rate of turnover during the years 1918–1929," all the teacher training institutions having no turnover of deans during these years were compared with those having three or more separations. The factors considered were size of school, size of town in which school is located, number of dormitories under the control of the institution, and the dean's salary and the number of hours she teaches per week. Table 4 gives these comparisons.

A further comparison between salary and turnover is given in table 5.

It will be noted that the larger turnover occurs in the smaller schools situated in the smaller towns or cities, and in schools in which the dean's teaching load is relatively heavy and the salary somewhat smaller. These factors may be only a few of a number which contribute to the maladjustment of deans in these institutions. It may be that the deans in the smaller institutions are younger, more liable to marry and less stabilized in their positions.

Comparisons between rate of turnover of deans and the rates of turnover in five other occupations are presented in table 6. In these cases the turnover rate was computed by the method used in this study. Other comparisons may be made by studying the investigations of turnover frequently published in this JOURNAL. This table shows that the turnover rate for deans during the year 1925–1926 is lower than the rate for Y. W. C. A. secretaries, women employees of a large financial house, and high school teachers in New York state. Except in the case of Y. W. C. A. secretaries the differences are not large. On the other hand, the turnover rate among zoölogists for the years 1920–1924 and among principals and supervisors in New York state for the year 1925–1926 is less than half as large as the rate for deans. The turnover rate for psychologists and teachers in schools of engineering is also smaller than the rate for deans. It would be interesting to study the relationship between the rate of turnover and the position of the subjects on the vocational ladder. These data suggest, as we would expect, that in the field of education, those who have attained the highest positions do not leave their institutions as readily as those in less eminent positions in inferior institutions.

SUMMARY

1. The average rate of turnover of deans of women in teachers colleges and normal schools covering the years 1918–1928 is 13 per cent; in the accredited liberal arts colleges and universities in Group I, 14 per cent; and in both groups together, 14 per cent.

2. The turnover rate in these institutions fluctuates from year to year with a barely perceptible tendency to decrease from 1925 to the present time.

3. The higher type of institution, as indicated by accrediting agencies and classification, tends to have lower turnover than the inferior type of institution.

4. Eighty-eight per cent of the separations in teacher training institutions are voluntary; 12 per cent, involuntary.

5. The outstanding reasons reported for the turnover of deans are: marriage, study and travel, better positions and being "not fitted for the work."

6. Seventy-one per cent of the 90 separations reported in normal schools and teachers colleges were avoidable; 29 per cent were unavoidable.

7. All but two of the fourteen institutions having the largest amount of turnover are situated in towns having a population of less than 1,000. The teaching load of the deans in these institutions is decidedly heavier than that of the deans in institutions having no turnover.

CONCLUSION

Facts such as those here reported have considerable importance for several groups of persons.

Deans of Women can see that there is a certain amount of shifting about among the members of their profession; not quite so much as in business but more than in other educational positions of about the same or lesser rank—school principals and supervisors, and college teachers.

A young woman who is contemplating entering the profession of dean may discover from these figures the possible openings due to resignations. There are, however, three possible sources of new positions in the field of deans of women:

1. The vacancies caused by temporary or permanent resignations. For example, in 1926–1927 there were from this source 67 openings for deans of women in higher institutions. Some of these openings, of course, were filled by deans who shifted from one institution to another, thus making the number of openings for new aspirants considerably less than 67.
2. The creation of the position in institutions previously having no dean. For example, the number of new positions created in normal schools and teachers colleges from 1918–1928 was 48; in liberal arts colleges in Group I, forty.
3. The expansion of the dean's office which creates new personnel assistantships.

These turnover rates also furnish norms with which a college president may ascertain the extent to which his institution is deviating from the average in this respect; and may lead him to study critically the dean's position in his institution and to try to discover the causes within the college, the community, or the dean which are responsible for the large turnover. Further investigations are needed to discover with greater accuracy the most frequent class of reasons why deans resign or are discharged, and the characteristics of deans who leave their positions most often. It would be valuable to know more definitely whether reasons pertaining to the position itself, to the dean's relations to her superiors and co-workers, or to her own health, home conditions and other personal factors most frequently cause separations of deans from their institutions (9). It would also be valuable to know whether deans who leave most often are usually married or single; whether they are older or younger, more intelligent or less intelligent, better educated or more poorly educated, more healthy or less healthy than the average dean.

REFERENCES

(1) ELSBREE, WILLARD. *Teacher Turnover in the Cities and Villages of New York State.* New York: Teachers College, Columbia University, 1928, p. 2.

(2) SLICHTER, SUMNER H. *The Turnover of Factory Labor.* New York: D. Appleton and Company, 1919, p. 90.

(3) STURTEVANT, SARAH M. AND STRANG, RUTH. *A Personal Study of the Deans of Women in Teachers Colleges and Normal Schools.* New York: Teachers College, Columbia University, 1928.

(4) JONES, JANE LOUISE. *Personal Study of Women Deans in Colleges and Universities.* New York: Teachers College, Columbia University, 1928.

(5) BERGEN, HAROLD B. Stability of Men and Women Office Workers. *The Journal of Personnel Research*, Vol. 5, July, 1926, 71–73.

(6) ELSBREEN, WILLARD S. *Teacher Turnover in Cities and Villages of New York State.* New York: Teachers College, Columbia University, 1928.

(7) GWINN, EDITH. Employment of Y. W. C. A. Secretaries, unpublished study made under the direction of Professor Kitson, Teachers College, Columbia University, New York.

(8) KITSON, HARRY D. A Preliminary Personnel Study of Psychologists. *Psychological Review,* Vol. 33, July, 1926, 315–323.

(9) Ho, C. J. Finding the Real Causes of Turnover. *Industrial Psychology,* Vol. 3, June, 1928, 246–248.

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The New College Presidents—Class of 1929

By Archie M. Palmer, *New York*

Mr Palmer, who appraises the 45 recent recruits to the exacting occupation of college president, is Associate Secretary of the Association of American Colleges.

DURING the first nine months of the year 1929, thirty-five new college presidents were elected. Six others who were elected in 1928 were inaugurated and four acting presidents were designated during that same period. Furthermore, there are at least ten other institutions, of which the writer has knowledge, where the affairs of the presidency are being temporarily administered by members of the staff pending the filling of existing vacancies.

It is to be expected that changes among college and university presidents will occur. As in all other fields of endeavor, they are in no sense novel or unique phenomena. And yet, when fifty-five such changes are recorded within the brief span of nine months an inquiry about the incoming men, their professional background, their personal qualifications and the considerations which led them to enter upon their new work is in order.

The institutions acquiring these new presidents are widely scattered geographically, being located in twenty-seven states. Four are in the New England states, seven in the middle Atlantic states, thirteen in the southern states, seventeen in the middle western states, and four in the western states. By states Illinois and Ohio, with five each, have had the largest number of changes, while New York comes next with four.

In the number are to be found the large state university and the small liberal arts college, the colonial college with its abundance of tradition and the recently organized college with its progressive ideals, the women's college and the co-educational institution, the independent college and the denominational college. They likewise vary from the small college of several hundred students to the large university enrolling tens of thousands.

Every one of these new educational leaders has had previous experience of an educational character. Thirty-one of them have held professorial rank in colleges and universities, while thirty-two have filled college administrative posts. Many have been both college teachers and college administrators, and a number of others have taught in schools of a preparatory or of a religious character.

As college teachers the largest number have been in the fields of (1) education, (2) theology or religious education, and (3) the social sciences.

Other humanistic subject-matter fields in which they have had teaching experience are: English, chemistry and physics, the biological sciences, mathematics, Latin, and the modern languages. Two have taught law, one electrical engineering, and one civil engineering.

It is very significant and reassuring to note the large number of these new presidents who have previously had either practical collegiate administrative experience or professional training which might be considered as positive preparation for the duties and function of the new offices they are assuming. One cannot fail to note this underlying trend toward the selection of college presidents who have been specifically trained for their tasks.

One man is entering upon his fourth college presidency, one upon his third, and three upon their second. Four served as acting presidents for periods of from seven to fourteen months before being elected to the presidency, while one has been for a year acting president of another college. Two have been principals of normal schools, one in this country, the other in India. One has been at the head of a theological seminary; another has been in charge of a religious training school. Six have held high school principalships or have been heads of preparatory schools, three others have been public school principals, and five have served as superintendents of schools. Two of these new presidents have been members of the boards of trustees of the institutions of which they have now become chief executives.

Eleven of the presidents and all four of the acting presidents have been called from the faculty or administrative staff of the very colleges over which they are now presiding. Eight of them have been academic deans, six have been heads of departments, and one has been comptroller and vice-president. One of the deans has also been provost of the institution of which he is now president and one of the departmental heads has also served as director of the university museums. One has been vice president of another institution. Seven have been academic deans elsewhere, and one a university secretary at another institution.

A number of these new educational leaders have pursued graduate study in the field of education or of educational administration. Four have taken their doctorates and one his master's degree in that field. Two have earned master's degrees with majors in religious education, one with a minor in education. Five others have taken graduate courses in education without having received any degree.

Two have been deans of faculties of education and seven have been professors of education in colleges and universities, three of them departmental heads. Two have been principals of normal schools, one has been president of a state teachers college, one has been dean of men in a normal school, and one has been a state superintendent of normal schools.

With one exception these new college heads all possess the baccalaureate degree. That one exception is a graduate of the United States Naval Academy, which he attended for four years after having previously spent three years at a state university.

Only two have not pursued further academic study beyond that required for the bachelor's degree, and they are both men technically trained.

It is surprising to find that only fifteen have attained the doctorate, and yet, it is gratifying to note this tendency to overcome the "Ph.D. bogey." Fourteen others have earned the master's degree. The University of Chicago and Columbia have each conferred three of the doctorates and Johns Hopkins two. One foreign doctor's degree was obtained from the University of Zurich. Four hold LL.B. degrees and one possesses a J.D. degree.

Ten have obtained the B.D. degree, or its equivalent, on graduation from a theological seminary. One man has an S.T.B. degree and another has received the degree of B.S.L. It is a sign of the times that, although twenty-six of the colleges concerned are affiliated with the various constituent boards of the Council of Church Boards of Education and two others are under denominational control, only fourteen of the men assuming presidencies at those institutions have had previous pastoral experience or theological seminary training while but one of the non-denominational schools elected a president who has had experience of that character.

Five of the new college heads have studied abroad, three of them earning advanced degrees from foreign universities. One of these, who was a Rhodes scholar from New Brunswick, received both his B.A. and his M.A. from Oxford and also studied in Germany. Three of the others studied in Germany, one of them studying in Switzerland as well and taking his doctorate there. The fifth man spent two years at Oxford where he was awarded the B.Litt. degree.

Eighteen of these new college heads are members of Phi Beta Kappa. Seven gained this honor in recognition of outstanding scholarship while undergraduates. Five were elected as alumni members on the occasion of the founding of chapters at their Alma Maters and four others were subsequently elected alumni members. The other two were elected honorary members of chapters at colleges other than those at which they had studied.

Nineteen of these new presidents have received honorary degrees; many of them have been the recipient of several. At least six of these degrees were conferred after the announcement of election to the presidency. The names of twenty of the new presidents and two of the acting presidents are included in the 1928–1929 edition of *Who's Who in America*.

In age the thirty-five new college presidents range from thirty to sixty-six years. The average age at the time of election was a few months over forty-eight years, with half of them falling between forty and fifty-five. Over sixty per cent are below fifty, while six are above sixty. The six elected in 1928 who were inaugurated this year range from thirty-five to fifty-four years in age, with an average of forty-seven years. The four acting presidents are considerably older, averaging over fifty-eight years of age.

There is a wide distribution in the places of birth of these administrators.

Twenty-four states and four foreign countries claim them as native sons. Pennsylvania ranks first with eight and New York second with four. The foreign-born hail from England, Japan, Nova Scotia and Switzerland, although all four have lived and taught in this country for a number of years.

Eleven institutions invited their own alumni to return and assume the chief executive post. One of these men referred to "the satisfaction which a graduate feels in being called back after thirty-eight years to the presidency of his Alma Mater" and several others recognized loyalty to Alma Mater as a real factor influencing them in making their decision. Five of them were at the time of election or had previously been members of the faculties of those colleges.

Nine have been recalled to head institutions located in their native states and in at least one instance this opportunity to serve his own state, and, as it happened, also his own university, was a consideration in accepting the presidency. Seven of those who had responded to the pull of Alma Mater returned to their native states as well. One of them returns to the scene of his boyhood and college life after a rich and fruitful career in public life, as an official of the State Department and as an international lawyer, to assume the presidency not only of his Alma Mater but also of the college where his father had spent practically his entire life as a professor.

In an effort to ascertain what considerations led these new college heads to accept these posts of vital educational leadership the writer corresponded with each one of the forty-five. Although this inquiry elicited responses varied both in character and in spirit, nevertheless it is both significant and reassuring to note the sympathetic attitude with which they are all approaching their new duties and responsibilities. On all sides there is a full recognition of the function and value of the undergraduate college of liberal arts and sciences and a positive expression of the conviction that it is "the critical link in our educational chain."

One of these new executives who has spent his entire professional life of close to forty years in the educational field, as an administrator and as a teacher as well as a student of education, has entered upon his presidency thoroughly convinced of the increasingly important place which the small arts college is coming to fill in American life. Another is especially keen about his new position because he believes that the smaller college can have a very valuable place in our educational system and further, that in such a school the administration and the faculty have an opportunity to know the students better and to help them in the development of well-rounded personalities in a way that is not possible in the larger university. The opinion is expressed by the newly-elected president of a college in the middle west that there is no better opportunity for educational advancement in America today than in the improvement of the liberal arts college.

Similar confidence in the future of the liberal arts college generally and in the future of their own institutions, as well as admiration for previous accomplishments at those institutions, is voiced equally emphatically by many others. With such men at the helm, subscribing so enthusiastically to this conception of the undergraduate college, renewed faith in the future of this "backbone of our educational system" is stimulated and strengthened.

Many look upon their election as affording them the opportunity to render a real service in this field and thereby to utilize the peculiar training and experience they have had and the unique qualifications they possess for the career upon which they are entering. Others recognize the opportunity afforded for constructive work in the definite field served by their particular colleges. As one man expressed it, the determining factor in his case was the insistent call of the opportunity to render a vital service to the young people of that state and "to help in the development of the leadership of a great and growing state." Another sees in his new post the opportunity of a wider field of work and a greater opportunity for worth-while service.

The conviction that his institution can be made to render a larger service to the state and the hope that he may be instrumental in helping along in that direction are posited by one of these new presidents as important considerations with him. Another recognizes the city in which his school is located as an outstanding civic, industrial and educational center and points with pride and admiration to the substantial status and record of the school. The belief that his college can make an outstanding contribution to the rural church and to rural life in America led one man to answer the call to a presidency where he plans to try the experiment of a more definitely church-centered program in one of our denominational colleges.

Keen interest in the physical, mental and spiritual training of the young prompted one man at the peak of a conspicuous military career to make his choice in favor of academic service. The opportunity to render the kind of service he desired to give to youth decided another, while interest in collegiate education of women was a consideration recognized by the only woman in the group to be chosen to head a college.

The need for the type of education that is Christian in spirit as well as in form was advanced by several as a material factor entering into their decisions. Recognition of the opportunity offered to promote education and religion together in a most favorable environment contributed toward one man's acceptance, while the desire to promote, to the best of his ability, Christian education helped another to decide. The fact that the college was in a position to emphasize the distinctly religious note in education was an effective influence in one case, as was the challenge of a difficult but fascinating task in training for Christian leadership in another.

We can rejoice in this general recognition on the part of these new college heads of the contribution that the Christian college is making to our social order, both in preparing young men and women for Christian leadership and Christian service and in developing in them attitudes toward life and one's fellow man that are socially desirable. The real worth of the college is measured by the liberal training which it affords its students, and its success in cultivating in them the ability to appreciate and evaluate the problems and situations which arise in their daily life.

In striving to attain this end we look to our college presidents—old and new—for guidance and leadership.

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Lost Time
An Investigation in a Railway Office

By J. D. Hackett, *New York*

Mr. Hackett, analyst and consultant in labor relations, here reports the facts from one office force, regarding amount of time lost from vacation, holidays, absence, lateness and half days. He is author of "Labor Management" and "Health Maintenance in Industry."

THE purpose of this study was to determine the disposition of the employee's time as a whole, with a view of establishing control.

Statistics of a railroad office force for the year 1924 were examined. (The figures for the last three days of the year were unavailable.)

Figure 1 is a diagrammatic representation of the various types of time lost that are dealt with in this study. The figures following each caption show in hours (or minutes) the disposal of time on a per capita basis in each instance.

The force consisted of an average of 56.83 employees and varied from a minimum of 55 to a maximum of 60. Seventy-five per cent of the total were males and 25 per cent were females.

The scheduled hours were 41.5 a week; 7.5 hours Monday to Friday and four hours on Saturday. Subtracting vacations and holidays, this makes a total of 1999.1 hours per year available working time. Table 1 summarizes the data showing the amount and character of the time lost.

Employees get two weeks vacation, with pay for twelve working days, provided they have at least one year of continuous service. Such days are exclusive of Sundays and legal holidays. With these limitations, the actual number of regular vacation days obtained was 647, 94.87 per cent, out of a possible 682. These figures do not include a "vacation" amounting to 112 days granted to an employee who, after a long period of service, was about to be pensioned. Had this figure been included, as technically speaking it might, the total of 769 days averages 13.5 days per employee per year.

Holidays are of two classes; legal and "special." The legal holidays amount to seven per year and do not overlap with vacation as stated above. In addition thereto there were three other full holidays, called "special," one on June 3, one for the departmental outing, and one for the Company Sports; there were also two half days granted, one on Christmas Eve and the other on New Year's Eve, making a total of eleven holidays.

It will be noted that if employees were absent on the non-legal four holidays they could not get equivalent time off.

The available working time, which is the working schedule less vacations and holidays, amounts to 1,999.1 hours or 289 days, the amount of time which employees are expected to work, for which they are paid and for which, if they are absent or late, the employer suffers through loss in wages, loss in service and loss in overhead.

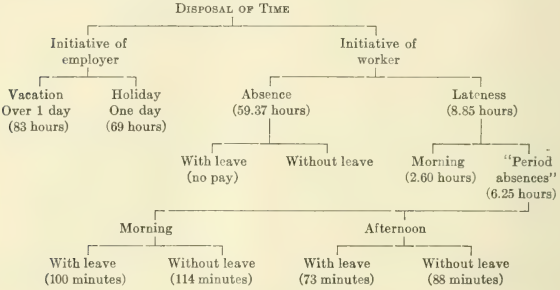

FIG. 1. DISPOSAL OF TIME

The ascertained absence includes 489 days, not including possible absences during three days for which statistics were not available.

There was no leave of absence (time off without pay) during the year, as far as could be ascertained.

Lateness is generally considered to be failure to start work at the appointed time in the morning, but there may be lateness returning from lunch. The time lost in the afternoon was only five per cent of the total and is, therefore, incorporated with the time lost when starting in the morning.

"Period" absences or "half days" were considered as lateness, except when they occurred on Saturdays. It is not unusual, however, to consider all period absences as part of absence statistics of one whole working period, in which case the average absence, instead of being 2.99, would have been 3.33 per cent.

ABSENCE

Table 2 shows the average number of employees, the number of working days, from which the vacations are deducted in order to show the total days that could have been worked. The record shows 489 days lost for all causes, or 2.99 per cent of the total available working time. The percentage of absence varies from a maximum of 5.55 in Winter to a minimum of .99 per cent in Summer, being influenced apparently by sickness during the Winter months, as the following figures show:

	Days	*Per cent*
Nov.-April, inc......	362	74.00
May-Oct., inc........	127	26.00
	489	100.00

TABLE 1

Amount and character of time lost

	HOURS PER EMPLOYEE PER YEAR	DAYS PER EMPLOYEE PER YEAR
Normal working hours (44 × 52)	2,288	312
Vacation (2 weeks of 44 hours)......................	88	12
	2,200	300
Scheduled working hours (41.5 × 52)................	2,158	312
Vacation (2 weeks of 41.5 hours).....................	83	12
	2,075	300
Holidays (11 days of 6.9 hours).......................	75.9	11
Available working time	1,999.1	289
Absence (489 days of 6.9 hours).......	59.37	8.6
	1,939.73	280.4
Lateness, Period Absences, etc........................	8.85	1.3
Time Worked.....................................	1,930.88	279.1 = 96.6%

The sickness figures show 381 days, or 77.91 per cent of the total lost on account of sickness; one hundred days, or 20.45 per cent lost on account of leave, and eight days, or 1.64 per cent lost on account of other causes. The rules governing payment during absence on account of sickness, as issued on March 10, 1925, are that an employee with less than one year's service is allowed no time at all; that with one year's service he is allowed six working days; with two years' service nine working days, and with three or more years' service twelve working days. By this ruling it is intended to say that if employees are sick, having the requisite amount of service, they are entitled to pay while sick for the time specified above. The records show that nine employees, of undetermined length of service, exceeded the twelve day period allowed. No information is available to show to what extent these employees were allowed pay beyond the specified period in accordance with the following ruling:

> "Any allowance for absence of longer periods on account of sickness shall be decided on the individual merits of the case by the Vice-President or other head of department." President's circular, March 10, 1925.

The figures above quoted show sickness to the extent of almost 78 per cent, but if half day absences on account of sickness are included, the percentage is 79.03. This percentage of absence on account of sickness is remarkably high, and especially when it is considered that the rate for men is considerably higher than the rate for women.

Absence with leave, sickness being accounted absence without leave, is as one to 3.81.

CAUSE OF ABSENCE

The cause of absence is classified under three headings. The major cause is specified as sickness, but it probably includes not only sickness of the individual employee but some cases of sickness of members of his family necessitating absence on the part of the employee.

TABLE 2

Absence record January to December, 1924, inclusive

MONTH	AVERAGE NUMBER OF EMPLOYEES	NUMBER OF WORKING DAYS	TOTAL NUMBER OF DAYS	DEDUCT VACATIONS			TOTAL DAYS THAT COULD HAVE BEEN WORKED	ABSENCES							
								Sickness		Leave		Other		Total	
				Usual	Special	Total		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
January	59	26	1,534	9		9	1,525	66	4.32	3	0.20	1	0.07	70	4.59
February	59	25	1,475	1		1	1,474	54	3.66	10	0.69			64	4.34
March	60	26	1,560				1,560	38	2.44	11	0.70			49	3.14
April	59	25	1,475	1		1	1,474	52	3.53	19	1.29			71	4.82
May	59	26	1,534	16		16	1,518	22	1.45	9	0.59			31	2.04
June	55	24	1,320	19		19	1,301	5	0.38	8	0.61			13	0.99
July	55	25	1,375	201		201	1,174	9	0.77	6	0.51	1	0.08	16	1.36
August	55	26	1,430	301	24	325	1,105	11	1.00	8	0.72	2	0.18	21	1.90
September	55	25	1,375	97	25	122	1,253	13	1.04	4	0.32			17	1.36
October	55	26	1,430		26	26	1,404	20	1.42	6	0.43	3	0.21	29	2.06
November	55	24	1,320		24	24	1,296	25	1.93	12	0.93	1	0.08	38	2.94
December	56	23	1,288	2	23	25	1,263	66	5.23	4	0.32			70	5.55
Average for period.	56.83	301	17,116	647	122	769	16,347	381	2.33	100	0.61	8	0.05	489	2.99

With leave: Cases where permission was obtained either before or after.

Without leave: Includes sickness.

There is something to be said for a more specific statement of the cause.

A comparison of the facts shows that the males had a 3.40 and the females a 1.94 per cent absence rate. Of the time lost through absence, men had 2.56 per cent on account of sickness and women 1.43 per cent for the same reason.

AVERAGE LENGTH OF ABSENCE

Table 3 shows the length of absences in days; the number and per cent of one-day, two-day, three-day, etc., absences and the number of days lost by duration of absences. The figures show that one-day absences account for almost 65 per cent of the total time lost, and that one- and two-day absences account for 83.25 per cent of the total time lost.

ABSENCES BY DAY OF WEEK

A study of table 4 shows that the average absence was 71 days by day of week from Monday to Friday inclusive with an extreme variation from 64 to 78, and was 132 days, or 27.10 per cent for Saturday. It is thus shown that the rate of absence on Saturday is almost double that on other days of the week. A comparison of the figures by cause of absence on Saturday shows a sickness rate of nearly 56 per cent as compared with a general sickness rate of nearly 80 per cent, indicating that it was easy to secure permission or be absent without permission at the week end.

TABLE 3

Average duration of absence

LENGTH OF ABSENCE	ABSENCES			DAYS LOST		
	Number	Per cent	Per cent cumulative	Number	Per cent	Per cent cumulative
days						
1	124	64.92	64.92	124	27.07	27.07
2	35	18.32	83.24	70	15.28	42.35
3	12	6.28	89.52	36	7.86	50.21
4	8	4.19	93.71	32	6.99	57.20
5	4	2.09	95.80	20	4.37	61.57
7	2	1.05	96.85	14	3.06	64.63
8	1	0.53	97.38	8	1.75	66.38
9	1	0.53	97.91	9	1.96	68.34
10	1	0.53	98.44	10	2.18	70.52
15	1	0.52	98.96	15	3.28	73.80
22	1	0.52	99.48	22	4.80	78.60
98	1	0.52	100.00	98	21.40	100.00
Total.....	191	100.00		458	100.00	

56.83 employees—75 per cent male; 25 per cent female.
Average duration of absence, 2.4 days.

TABLE 4

Absences by day of week

DAY	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL		AVERAGE 5 DAYS	
													Number	Per cent	Number	Per cent
Monday..................	6	10	11	9	3	6	5	3	4	4	3	14	78	16.02		
Tuesday..................	8	10	8	11	5	1	1	2	2	4	6	12	70	14.37		
Wednesday...............	13	10	8	9	5	2	1	3	4	4	8	11	78	16.02	71	14.58
Thursday................	12	11	6	9	4	0	2	2	1	2	8	8	65	13.35		
Friday..................	13	10	5	9	3	0	2	2	1	3	4	12	65	13.14		
Saturday................	70	64	49	71	29	13	16	21	17	29	35	70	132	27.10		
Total......................													487			

When an absence occurs on Saturday, or on another day when there is a half-day, it is counted as a whole in terms of days of 7 hours 20 minutes.

The above facts refer to only those employees who have had a full term of employment during the year and excluding 4.83, those who had terms of service of less than a year.

TABLE 5

Lateness record of railroad office employees January to December, 1924, inclusive

Month	Average number of employees	Number of working days	Total number of days	Deduct: Vacation	Deduct: Absence	Deduct: Total	Total days that were worked	Lateness: Number	Lateness: Per cent	Total number of minutes late	Average minutes per lateness
Jaunary	59	26	1,534	9	70	79	1,455	76	5.22	947	12.46
February	59	25	1,475	1	64	65	1,510	78	5.53	983	12.60
March	60	26	1,560		49	49	1,511	64	4.24	634	9.91
April	59	25	1,475	1	71	72	1,403	49	3.49	471	9.61
May	59	26	1,534	16	31	47	1,487	36	2.42	382	10.61
June	55	24	1,320	19	13	32	1,288	68	5.28	585	8.60
July	55	25	1,375	201	16	217	1,158	76	6.56	659	8.67
August	55	26	1,430	325	21	346	1,084	114	10.52	1,093	9.59
September	55	25	1,375	122	17	139	1,236	81	6.55	713	8.80
October	55	26	1,430	26	29	55	1,375	99	7.20	835	8.43
November	55	24	1,320	24	38	62	1,258	84	6.68	814	9.69
December	56	23	1,288	25	70	95	1,193	85	7.12	749	8.81
Average for period	56.83	301	17,116	769	489	1,258	15,858	910	5.74	8,865	9.74

Note: The above tabulation does not include 96 half day absences; 45 in the forenoon and 51 in the afternoon.

LATENESS

The scope of this subject is determined by the definition and also by attendant circumstances. While, strictly speaking, lateness is loss of time in coming to work, there are situations in which time may be lost, in returning from lunch and, in another sense, time lost by leaving work earlier than is usual both before lunch and before the termination of the day's work.

For the purpose of examination it was considered advisable to incorporate the lunch latenesses with the morning lateness since they only constitute 5 per cent of the total. It was also decided that, in view of the number and extent of half-days taken during the year, not to include them in lateness.

The figures used in the analysis of absence were also used for the study of lateness. The tabulation of results as shown in table 5 gives the percentage of lateness as 5.74, the average minutes per lateness as 9.74 and the average number of latenesses per year as approximately seventeen. In terms of hours, the total time lost due to morning and "lunch" latenesses amounted to 147.75 hours, but the time lost due to 96 half-day absences was considerably more than this, being 202.5 for morning half-days and 153 hours for afternoon half-days, or 2.5 times as much.

TABLE 6

Analysis of half days (classed as latenesses)

The day is divided into two periods; the first of 270 minutes' duration, and the second of 180 minutes' duration; before and after the lunch hour. These figures do not include Saturday morning absences.

MONTH	MORNING			AFTERNOON			TOTAL ALL HALF-DAY LATENESSES
	With leave	Without leave	Total	With leave	Without leave	Total	
January	2	3	5	3		3	8
February	5	5	10	1		1	11
March	3	1	4	4	1	5	9
April	1	1	2	4	4	8	10
May	1	1	2	2	4	6	8
June	3	3	6	4	1	5	11
July	1		1	2	1	3	4
August	1	1	2		3	3	5
September	1	4	5		3	3	8
October	1		1	1	4	5	6
November	1	3	4		5	5	9
December	1	2	3	2	2	4	7
Total	21	24	45	23	28	51	96

Total time lost through half days, morning 45 × 270 .... 12,150 minutes
Total time lost through half days, afternoon 51 × 180 .... 9,180 minutes

Total .... 21,330 minutes
355.5 hours

48 days, 3 hours, 20 minutes

Note: Statistics for the last three days of the year were not available.

ABSENCE AND LATENESS

Comparing absence with lateness in regard to the time lost, it will be seen that the ratio is as 1 to 24. When, however, half-days are included in the figures, the ratio is as one to seven approximately. It is, therefore, a cardinal mistake to lay undue emphasis upon prevention of lateness, even though the maintenance of punctuality is a factor in discipline.

There is only one cause of importance assigned for lateness, and that is transportation, "Train late," but engineers would be horrified if they saw that their trains were late as often as the records of employees seem to indicate. There are, however, cases where commuters can only obtain trains which permit a narrow margin and where a special arrangement might be made to accommodate people in such conditions.

Table 6 shows morning and afternoon half-day latenesses somewhat evenly distributed as to periods and also as to leave. It will be noted that the two periods are of unequal duration, the first being 270 and the second 180 minutes. This results in the first case in a loss of 12,150 and in the second of 9,180, an aggregate of 21,330 minutes, 355.5 hours, approximately 48 days, 3 hours and 20 minutes.

On the basis of time lost, therefore, it is much more important to control morning and afternoon half-days off than morning latenesses.

No investigation was made to determine the incidence of lateness among male and female employees, or in the few cases where a cause was assigned, to tabulate the cause, inasmuch as the relative amount of time lost was so comparatively slight.

If experience as regards absences is a criterion, it will be found that latenesses vary considerably among individuals, that some people are never late while others are constitutionally unable to be on time.

An average of 56.83 employees obtained 96 half-days during 1924; 45 in the morning and 51 in the afternoon. These figures show the following time lost in terms of days, hours and minutes per employee per year:

	Total	*Average per employee*
Days	51.52	0.91
Hours	366.50	6.25 hours
Minutes	21,330	375 minutes

It will be noted that the time lost through period absences, or so-called half-days is nearly 2.5 times greater than the time lost through lateness.

CALCULATION OF HOURS

The working schedule in this office calls for 44 hours a week; eight hours a day for five days and four hours a day for Saturday. Custom, however, has modified these hours and the *actual* hours are 7.5 hours a day for five days a week, equalling 37.5 hours, and Saturday four hours, a total of 41.5 hours per week. This gives the following:

	Hours	*Minutes*
Per week	41.5	2,490
Per day (5 days)	7.5	450
Per day (Saturday)	4.0	240
Average for week	41.5	2,490

Table 7 shows the total and average time lost through period absences and lateness.

SUMMARY

Table 8 shows that while the office employees whose records have been examined are paid for 2,006 hours of work per year, they are in attendance only 1,937.78 hours, that is, each person worked 68.22 hours less than the time for which he was paid. Assuming wages to be fifty cents per hour, the loss per employee per year would amount to $34.11. The actual average for 1,692 employees was 62 cents per hour in 1925, total salaries $2,272,308. At this rate the loss would be $46.20 per employee per year.

Calculated on a day basis, the working year consists of 312 days, of

TABLE 7

Time lost through period absences and lateness

MONTH	TIME LOST IN MINUTES			TOTAL TIME LOST		AVERAGE MINUTES LOST PER EMPLOYEE PER YEAR
	Lateness	Period absences		Minutes	Hours	
		Morning	Afternoon			
January	947	1,350	540	2,837	47.28	48.08
February	983	2,700	180	3,863	64.38	65.47
March	634	1,080	900	2,614	43.57	43.57
April	471	540	1,440	2,451	40.85	41.54
May	382	540	1,080	2,002	33.37	33.93
June	585	1,620	900	3,105	51.75	56.45
July	659	270	540	1,469	24.48	26.71
August	1,093	540	540	2,173	36.22	39.51
September	713	1,350	540	2,603	43.38	47.33
October	835	270	900	2,005	33.42	36.45
November	814	1,080	900	2,794	46.57	50.80
December	749	810	720	2,279	37.98	41.44
Total	8,865	12,150	9,180	30,195	503.25	531.32 or 8.85 hours

TABLE 8

Summary of time lost and worked

TIME LOST	INDIVIDUAL		TOTAL	
	Hours	Days	Hours	Days
Vacations	83.00	12.0	5,306.0	769.0
Holidays	69.00	10.0	3,919.0	568.0
Total	152.00	22.0	9,225.0	1,337.0
Absence	59.37	8.6	3,374.0	489.0
Lateness	8.85	1.3	504.0	73.0
Morning	2.60	.4	148.0	21.0
Period absences	6.25	.9	355.5	51.5
Total	68.22	9.9	3,878.0	562.0
Total Time Worked	1,937.78	280.1	109,241.0	15,832.0

which twelve days are absorbed by vacation, ten by holidays, 8.5 by absence and 1¼ for other forms of lost time. The total represents a loss of 3.4 per cent of the available working time, and, as such, 3.4 per cent of the cost of wages and salaries.

The evidence of the need for control is plain, not so much from this study as from the fact that where absence figures are not kept, the rate is apt to be higher. The figures themselves give evidence that the mere keeping of records is insufficient to control absence; *they must be used properly.*

Two points have to be considered in planning a reduction of the loss, assuming that the volume of work is available:

1. What is the practicable extent to which it is possible to reduce the lost time; and
2. What will be the cost?

Considering the first point; it can be claimed that if under present circumstances an absence rate in one month of one per cent was attainable, a like reduction throughout the year might be secured as a result of organized measures. The rate of absence, in fact, did vary from .99 to a maximum of 5.55 per cent with a general average of 2.99 per cent. It will be seen, then, that there is nothing extravagant in expecting a decrease of the absence rate by one-half or fifty per cent of the total with an accompanying saving of $17.05 per employee per year. Against this saving must be charged the cost of obtaining the reduction.

The measures taken to reduce time lost are divided into two phases:

1. The proper keeping and use of records; and
2. Medical first aid.

In those departments where records are already kept there would be no additional cost; revised and more efficient methods offsetting the extra trouble of compiling a monthly statement from the figures usually collected. The fundamental requirements are that each department shall keep a record according to a uniform standard, that the results shall be promptly forwarded to a central bureau, that the facts shall be compiled and furnished to each department head on a percentage basis without delay, and that the worst offender in each group has his record brought to his attention, formally.

The large percentage of sickness disclosed by the figures warrants the services of a doctor who shall be in attendance during office hours to give first aid and advice in case of incipient illness. Such a medical service acts as a moral deterrent on alleged cases of sickness and as an aid to those who are genuinely ill and desirous of maintaining their attendance record.

Clerks, feeling any tendency to sickness, are invited to consult the Company doctor so that preventive measures may be taken, a step which tends to reduce all forms of lost time. Medical supervision not only prevents and reduces absence due to sickness but it also deters the supposititious cases which, in the above study, were clearly indicated by the figures. It is evident, also, that the savings effected by better attendance would easily offset the cost of medical attendance.

Several outstanding facts result from this study. The relative volume of time lost, its character and incidence are determined and, therefore, the steps that should be taken for its control are indicated. Results are obtained, however, by the practical disposition of individual cases. Only a few employees in every group are found to be chronic offenders; they have to be singled out and dealt with.

Lateness, and even absence, is not always an evidence of indifference; men are, perhaps, late in the morning because they have worked late the previous night. It would be foolish in such a case to insist on rigid conformity to a rule which is really intended as a means of securing the full quantum of work. Moreover, rigid insistence on constant attendance presupposes effective work within the hours of employment.

Manuscript received February 27, 1929

Pedestrian Accidents and Age

By Adelbert Ford, *University of Michigan*

The day of the automobile has evidently caught the older generation unprepared, if one may judge from the statistics of pedestrian fatalities in Detroit, as reported to Dr. Ford, Assistant Professor of Psychology in the University of Michigan, at Ann Arbor.

The age distribution of 182 pedestrians killed in automobile traffic in Detroit during a nine months' period is compared with the age distribution of the population. Children, as might be expected, showed a high death ratio. But older people—forty-five years of age and over—showed a death frequency even greater than children.

WE SHALL present a bit of quantitatively measured evidence concerning a situation with which most of us have had naïve experience, namely, ability to travel on foot on streets under the conditions of modern automobile traffic. This evidence may help to answer some pertinent questions on the relationship of age to fitness for work, a problem which is in the foreground of discussion both among employment men and leaders of organized labor.

We have chosen one of the most difficult cities in the United States for the expression of this ability. In the city of Detroit the intersections are frequently complicated by the fact that five to eight streets may converge in one center, the automobile traffic being especially dense in the absence of any other efficient means of travel. There are no subways or elevated tracks. The number of automobiles per mile of street is in excess of the amount in New York City and the average speed per car is about fifty per cent greater, based on samplings taken within the last year. Police supervision is excellent and efficient, the high average speed of cars being maintained by the fact that there are relatively few traffic blockages.

During the past year and a half each fatal accident has been reported to the author along with a brief description of the conditions. Among the details given was the age of the pedestrian who was killed. The absolute number of fatalities of a given age means very little unless it is known how many people of that age were actually exposed to traffic conditions. This statistical error seems never to have been adequately controlled.

Over a period of nine months we selected only those accidents where a pedestrian was killed by a moving automobile. We eliminated deaths caused by two cars colliding, a car and street-car in collision, and railroad crossing accidents. We wished to make the study strictly one of the hazards of pedestrians from automobile traffic. We now divided the pedestrian fatalities into those age groups which are classified in the 1920 census of the United States, namely, 0–5, 5–14, 15–24, 25–44, 45–64, 65 and up. Although there has been a lapse of eight years since this census table was made, there is evidence that the apportionment of age groups seldom changes by as much as one per cent in any large city in the United States. It is extremely doubtful if the character of the Detroit population has shifted by even a major fraction of this amount. Even if this error be granted at its highest possible figure, it will be seen that the difference in accident probability in our tables runs as high as 8,000 per cent in some groups; certainly the error of population shift is negligible.

TABLE 1

Comparative accident frequency for different age groups

AGE GROUP	NUMBER OF FATALITIES	FATALITIES PER 10,000 PEOPLE	INDEX OF ACCIDENT FREQUENCY
0– 5	20	1.785	10.7
5–14	45	2.867	17.2
15–24	3	0.167	1.0
25–44	30	0.766	4.6
45–64	48	3.758	22.5
65 up	36	14.570	87.2

By dividing the number of fatalities of a given age group by the population of that age group for the city of Detroit, we can state a frequency figure for accidents within any of the above listed age classes. Table 1 gives the results covering a period of nine months in the city of Detroit.

The following facts seem pertinent in Table 1. The optimum group for safety is the class of people between 14 and 25 years of age, the first ten years after adolescence when all faculties are mature and there is a minimum of age deficiencies. The high frequency of the 5–14 group is caused by the fact that this is the school age where exposure to street conditions is high and mental responsibility low. It might be interesting for parents to know that there is seventeen times as much chance for a child to be killed as a young adult. Much of this probability could be cut down by proper parental education of children. The 0–5 group shows a lower frequency than the 5–14 group, probably because some of this group are infants, and also because there is a closer parental supervision and less street exposure. But even a ten-fold probability over young adults shows a woeful deficiency of parental supervision. These facts are not unexpected, however.

The surprising portion of the table consists in the probability figure for individuals in the higher age classifications. We have adopted the accident frequency of the 14–24 group as a standard for comparison, and so have given it the value of 1. Beyond the age of 24 the accident rate mounts steadily and very rapidly. It should be noted that at the age of 65 and up the accident rate is in the neighborhood of 87 times the rate of young adults. In view of the fact that the old person is always upbraiding the youth for his apparent carelessness, it seems interesting to find that it is the old person who is the most careless, defining carelessness as the failure to be aware of all potential causes of accidents.

We note that the statements of accident frequency are based on a total of only 182 deaths. To the criticism that such a small number does not allow such fine divisions of groups, we may indicate that three-fifths of the accidents were to be found in the upper age group having less than one-third the population. This makes a population group large enough to be statistically reliable.

The increase in accident probability with age may be due to the following factors, which are, as yet, unknown in their relative effectiveness:

1. Decrease in muscular agility.
2. Increase in body weight and decrease, therefore, in speed of movement.
3. Preservation of traffic habits from the days when automobiles were not a hazard.
4. Impairment of sensory acuity.
5. A variety of senile effects on mentality.
6. Mental abstraction ("absent-mindedness").

It would seem that all of the above conditions increase with the age of the individual beyond 24. It is impossible to say which factor is the most important, or whether one, a few, or all of the factors work together. It is probable that the average human being fails to realize the degree to which the above factors come on as age advances and therefore retains certain "protective mechanism" in the form of youthful attitudes and conceits which are made necessary by fears of social stigmas against old age. Most people dread to admit the inescapable consequences of growing older.

In view of the fact that the age limit has been discussed as a selection factor in employment, it may be that equally important facts are procurable in the hazardous occupations of industry and that the recent tendency to set age limits for certain jobs is justified.

Manuscript received June 12, 1929

Consistency of Operating Efficiency

By C. S. Slocombe, *Personnel Research Federation*

To what extent do operators who have an excessive number of accidents in one year, tend to have many accidents in other years? Dr. Slocombe's answer is based on data from the electric railway which he is serving as Safety Advisor.

ACCIDENT reduction work with individual employees has now been in operation in the Boston Elevated Railway for two years. It has been shown as a result of one inquiry that 55 per cent of the collision accidents of street cars are caused or contributed to by approximately 27 per cent of the operators. These men have been regarded as accident prone and safety efforts have been directed towards curing them of this condition.

During the two years of effort, collisions between street cars and automobiles have been reduced by 2000, or 35 per cent. This result has been obtained because of the number of accident prone men who have been successfully cured. Their accidents have been reduced from an average of seven each to three each per annum.

The treatment of so-called accident prone men has brought out the question as to the consistency of safe operating efficiency over a number of years. To determine this a study has been made of the accidents over a period of four years of all the motormen (260 in number) in one division. (Conductors who are also qualified to operate one-man-cars and buses were omitted because they change about considerably in their work from year to year.)

The following are the intercorrelations of the accidents of this group during four years:

1st year with 2nd year	.51
3rd year	.43
4th year	.38
2nd year with 3rd year	.41
4th year	.38
3rd year with 4th year	.43
Average	.42

These figures are in substantial agreement with those of Farmer.[1] Farmer also noticed some tendency for the correlation to decrease with increasing time interval. The figures above also show some such tendency, but it is so slight as to be statistically insignificant and need not, therefore, be discussed.

These coefficients are low enough to show that there is a considerable variation in the number of accidents a man has from year to year. Such factors as difference in number of hours worked, in hazards of route chosen, in health conditions, home circumstances, luck, etc., would account for this. (All accidents are included, —chargeable and non-chargeable.) The question is, however, rather as to the extent to which in spite of these factors, operating efficiency is a consistent factor determining the number of accidents.

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[1] Farmer, Eric, and Chambers, E. G. *A Study of Personal Qualities in Accident Proneness and Proficiency.* Industrial Health Research Board Report No. 55, p. 65. H. M. Stationery Office, London, 1929.

It is possible by use of statistical formulae to determine the correlational relationship of the accidents in each year with this operating efficiency and also of the total accidents of the four years with operating efficiency.[2] These figures are:

Correlation of 1st year's accidents with operating efficiency	.69
Correlation of 2nd year's accidents with operating efficiency	.67
Correlation of 3rd year's accidents with operating efficiency	.65
Correlation of 4th year's accidents with operating efficiency	.59
Correlation of total accidents with operating efficiency	.87

This correlation (.87) of total accidents with operating efficiency shows a high relationship. It can be converted into a percentage figure giving the actual proportionate weight of operating efficiency in number of accidents or in other words the consistency of operating efficiency over a period of four years as judged by the number of accidents.[3]

This further calculation gives the figure 76 per cent for the consistency of operating efficiency.

CONCLUSIONS

1. Over four years the number of accidents a man has depends to the extent of 76 per cent on his operating efficiency and 24 per cent on sporadic or uncontrolled conditions.
2. This statement implies that accident prone men are on the whole higher than the average in their accidents 76 per cent of the time.
3. This does not, however, imply that operating efficiency cannot be improved, for safety work has been done during the past two years favorably affecting the accidents of the men here studied.

Manuscript received December 20, 1929

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[2] Operating efficiency may be regarded as a general factor influencing the accidents of each and every year. Other factors are uncorrelated as may be shown by applying the Tetrad Differences criterion. Then

$$r_{1g} = \sqrt{\frac{r_{12}\,r_{13} + r_{12}\,r_{14} + r_{13}\,r_{14}}{r_{23} + r_{24} + r_{34}}}$$

and similarly for r_{2g}, r_{3g}, and r_{4g}. (Spearman, C., *Abilities of Man.* 1927.)

By the formula for the correlation of sums,

$$r_{(a_1+a_2+a_3+a_4)g} = \frac{S(r_{ag})}{\sqrt{4 + 2\,S\,(raa)}}$$

the correlation of the total accidents with the operating efficiency is obtained.

[3] The correlation of 2 perfect measures of $x = 1$. If one measure is affected by another uncorrelated factor y, $r_{(x)\,(x+y)}$ will be less than 1. If y has equal weight with x, $r_{x\,(x+y)} = 1/\sqrt{2} = .71$. (Spearman, C. S., Correlation of Sums." *British Journal Psychology.* 1913.) If y has one-half the weight of x, then $r_{x(x+y)} = \frac{1}{\sqrt{1.5}} = .81$ and so on. In the above problem let $x =$ true operating efficiency and $(x + y) =$ number of accidents (determined partly by true operating efficiency (x) and partly by other factors (y)).

Then $r_{x(x+y)} = .87 = \frac{1}{\sqrt{1 + w}}$, where $w =$ weight of y. The value of $w =$ weight of $y = .32$. Thus $\frac{x}{(x + y)} = \frac{1}{1.32} = 76$ per cent.

Selecting Executives

An Evaluation of Three Tests

By R. O. Beckman and Michael Levine, *City of Cincinnati*

Prediction of executive ability is important in municipal administration, as in business and industry. When this study was made, Mr. Beckman was Director of Personnel in the city government of Cincinnati. He is now Personnel Manager of the Kroger Grocery and Baking Company of that city.

In a search for tests to discover executive aptitude which might be of value in selecting supervisors, bureau chiefs and department heads, the City of Cincinnati has experimented with three test possibilities—the Allport Ascendency-Submission Study, the Laird Introversion-Extroversion Test, and a following-directions test. Comparative scores for a group of supervisors and a group of employees without supervisory responsibility indicate that the Allport Study may have considerable prognostic value but that extroversion as measured by means of the Laird inventory is not a factor in executive ability for non-selling positions.

THE Cincinnati Civil Service Commission has, for some time past, sought certain tests which, when the occasion demanded, might be used to give a measure of potential executive ability. These would have to be in the nature of personality tests. Two tests of this nature have recently presented themselves as possibilities: the G. W. and F. H. Allport A-S Reaction Study, and the shortened form of the Personal Inventory C-2 Study prepared by the Colgate University Psychological Laboratory. The first measures ascendancy or self-assertion and its opposite, submission; the second, introversion and its opposite, extroversion.

The Reaction Study[1] presents actual situations to the subject. He is asked to check that one of two, three, or four possible reactions to a situation which will best describe his behavior. An example will illustrate the type of question asked:

> "When a book agent or insurance salesman comes to your home or to your room, do you as a rule find it difficult to refuse to listen to him, or to get rid of him as soon as the purpose of his visit becomes clear?
>
> "Quite difficult..................
> Moderately difficult..............
> Not at all difficult................"

The first possible answer counts minus four, the second minus one and the third plus one. There are 33 such situations, the scoring value of the responses varying with each question.

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[1] The A-S Reaction Study, a scale for measuring ascendance-submission in personality, by Gordon W. Allport and Floyd H. Allport. Published for Houghton Mifflin Company by Riverside Press, Cambridge, Mass., 1928.

The shortened form of the Personal Inventory C-2 Study[2] consists of eight questions and rating scales out of a total of 48 on the complete form issued for use with college students. These eight questions are the most prognostic of the 48. A copy of this form will be found in figure 1. Introversion is counted from the right in all but the second question where it is counted from the left. A check on either of

PERSONAL INVENTORY

IDENTIFICATION #......
SCORE ......

DIRECTIONS: Describe yourself by answering the questions asked in the large type. Do this by making a check mark through one of the half-inch lines. After reading over the phrases in small type after each question, think back over your life for the PAST FEW MONTHS and determine where the check should be made to describe yourself accurately. Describe your AVERAGE BEHAVIOR AND THOUGHTS.

There is no time limit to this. Read each line entirely before making a check mark. Describe your AVERAGE thoughts and behavior for the PAST FEW MONTHS ONLY. Check only one of the half-inch sections in answer to each question.

1. HOW EASILY HAVE YOUR FEELINGS BEEN HURT BY REMARKS OR ACTIONS REFERRING TO YOU?	(4) Easily and often aroused	(3) Feelings easily hurt	(2) Usually noticed others' intentions	(1) Affected in rare instances	(0) Gave them no attention
2. HOW HAVE YOU RESPONDED WHEN PRAISED?	(0) Did not work so well	(1) Worked same as usual	(2) Sometimes did a little better	(3) Often worked better	(4) Generally worked better
3. HAVE YOU BEEN INCLINED TO WORK THINGS OUT ALONE?	Usually did not ask for help	Hesitated to ask for aid	Sometimes sought help	Did not hesitate to seek aid	(0) Sought and got help on quite a few cases
4. HOW HAVE YOUR LIKES FOR ATHLETICS AND THINGS INTELLECTUAL COMPARED?	Liked best all intellectual	Preferred intellectual	Little preference	Preferred athletics	(0) Happiest in all physical contests
5. HOW HAVE YOU BEEN ABOUT MAKING FRIENDS?	Cautious	Must know them a long time first	Slightly reserved	Get acquainted easily	(0) Made friends with everyone
6. HAVE YOUR MOODS CHANGED WITHOUT APPARENT CAUSE?	Often changed	Changed in some instances	Kept in fairly uniform spirits		(0) Moods almost always the same
7. HAVE YOUR MOODS CHANGED WITH CAUSE?	Always responded quickly	Fairly quick response	Must be strong reason		(0) Seldom changed
8. HAVE YOU EXPRESSED YOURSELF BETTER IN SPEECH OR IN WRITING	Best in writing	Preferred writing	No preference	Preferred speaking	(0) Talk considerably better

FIG. 1. SHORTENED FORM OF THE LAIRD PERSONAL INVENTORY

the first two dashes is rated zero, the next two one, the next two two, and so on up to four, as illustrated in figure 1.

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[2] Discussed in *The Psychology of Selecting Men* by Donald A. Laird, McGraw-Hill Book Co.

It was also decided to give a simple test of following written directions which had been used with some success in supervisory clerical examinations.

Identification #......
Score ......

In the pattern below, fill in or black the little squares on each side of each corner. Then locate the little square at the center of all the squares. Let this be blank, but make an ordinary or Greek cross around it by filling in each two adjacent squares above and below it and on each side. Then fill in the three middle squares half way between the two outer corner squares on every side. Then fill in the four squares where the fifth rows of squares from each corner cross.

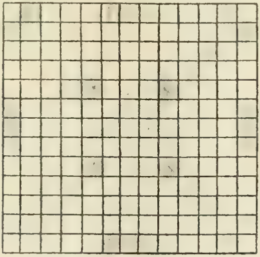

Fig. 2. Following Directions Test

This test contains four instuctions, the answers forming a design on a portion of cross section paper. See figure 2.

As experimental subjects 30 executives (the City Manager, department heads and bureau chiefs) and 31 water meter readers were used. One department head was arbitrarily eliminated because he was by nature essentially a technical expert (an engineer) thus leaving 29 executives. Most of these are probably somewhat above the average for city officials, but some may not be. As a measure of the efficiency of the men the efficiency ratings for June, 1928 were used.

METHODS AND RESULTS

Since the group of executives consisted of bureau chiefs who had less responsibility as well as department heads, a rough correction was made in the efficiency ratings of the lesser executives so that they would be more fully comparable with those of the department heads. The efficiency ratings then correlated .25 with the introversion scores and .05 with the A-S Reaction Study. Due to the fact that not all executives were graded by the same person, these factors were again correlated, using only those who were rated by the City Manager. The efficiency ratings of department heads now correlated −.01 with introversion and .41 with the A-S Reaction Study. These latter correlations seem to be closer to the truth since the ratings are more reliable, as shown by a coefficient of reliability of .94 between two series of ratings, both made by the City Manager. The similarity of the means and standard deviations in the two cases is shown in table 1.

TABLE 1

Showing means and standard deviations of efficiency ratings, introversion score and A-S Reaction score for the entire group of executives and for executives rated by the City Manager

	1st case		2nd case	
	M.	S.D.	M.	S.D.
Efficiency Ratings.....	81.6	7.22	84.9	8.87
Introversion Score....	15.8	3.14	16.7	3.46
A-S Reaction Score...	17.1	12.58	14.3	11.83

The water meter readers were all rated by one person and the ratings were considered to be reasonably reliable. This group was chosen because it was a typical non-executive group of adequate size which it was believed would contrast satisfactorily with the executives. Here efficiency ratings correlated .21 with introversion and −.07 with the A-S Reaction Study. The comparison with the correlations of the executives shows a greater agreement between efficiency and introversion and a lesser agreement between efficiency and the A-S Reaction Study.

Some relationship was sensed between the A-S Reaction Study and the introversion test. This was substantiated in a small degree by the correlations obtained. With executives it was −.25 and with water meter readers it was −.15. The two negative correlations show that introversion and ascendancy are to some degree opposites.

TABLE 2

Showing means and standard deviations of efficiency ratings, introversion score and A-S Reaction score for executives and for water meter readers

	Executives		Water meter readers	
	M.	S.D.	M.	S.D.
Efficiency Ratings.....	84.9	8.87	81.5	3.00
Introversion Score....	15.8	3.14	14.0	4.15
A-S Reaction Score...	17.1	12.58	−.9	17.18

To continue the comparison of executives with water meter readers, table 2 shows the means and standard deviations of the sets of scores.

The most marked disagreement occurs in the case of the A-S Reaction Study. The level for executives is 18 points above that of the water meter readers. The standard deviation is smaller by 4.6 points. The standard error of the difference between the means is 2.73 for efficiency ratings, 1.99 for introversion scores and 3.91 for A-S Reaction scores.

The ratios of the difference in the means to the standard error are 1.25, .90 and 4.60, respectively. These considerations, together with the correlation of .41 between efficiency ratings (as marked by the City Manager) and the A-S Reaction Study, point strongly to the use of the A-S Reaction Study in a battery of tests for executives.

A revised form of the efficiency rating scale was used in January, 1929. The correlation of the A-S Scores with the new ratings, as made by the City Manager, is .46, which substantiates the former findings. The new ratings also prove the reliability of the earlier efficiency ratings used through this study, the coefficient of reliability being .94. Since these figures were based on but 12 ratings, it was desirable to see what they would be with all the executives included. The weakness of any efficiency rating plan is, of course, the fact that different standards are used by various rating officers. In order to eliminate the influence of this factor to some extent, the Director of Personnel, who was acquainted in a general way with the 29 executives, made an independent rating of each. These unofficial ratings correlated .33 with the A-S Study, which supports the assertion made above that the A-S Reaction Study has value in selecting executives. Had the personnel office been more intimately acquainted with the executives and their abilities, it is probable that a higher coefficient would have resulted.

There is no indication that the short form of the Personal Inventory test would be useful in selecting executives and there is but a slight possibility of a place for it in the battery for water meter readers. If the test could be further revised so that a greater standard deviation could be obtained it might have some significance. From the observation of the introvert-extrovert test as used in selecting salesmen by a large Cincinnati firm, it is apparent that this test is of value in the sales field. It cannot apparently have any particular significance as far as non-sales executives or supervisors are concerned, however.

The "Following Written Directions" test, was used in order to determine what, if any, facts might be discovered regarding it. Scoring was based on the number of directions followed correctly; the scores falling into intervals of 25 from 0 to 160. Table 3 of means and standard deviations is interesting.

TABLE 3

Showing the means and standard deviations of the scores secured in the following written directions test for executives and for water meter readers

	EXECUTIVES	WATER METER READERS
Means	91.1	72.4
S.D.	12.62	27.05

The level of executives is much higher and the standard deviation is much lower. This suggests that executives follow such written directions better than do water meter readers and do it more consistently as a group. The standard error of the difference between the means is 29.8. The ratio of the difference between the means to its standard error is .62. This means that the chances are almost one in four that the true difference is in the opposite direction to the one indicated. No correlation was computed between the efficiency ratings and the scores in this test because of the difficulty of scoring with any great precision. A test of this kind, however, particularly one that allows finer distinctions in scoring, might well be tried in a battery for selecting executives.

CONCLUSION

It was not expected to find any of the tests capable of selecting an executive without using other tests with them, such as a test to determine the practical knowledge and technique gotten from experience. The statistical analysis made, indicate that an executive should be ascendant, as tested by the Allport and Allport A-S Reaction Study, and shows that it does not matter whether he is introvert or extrovert as indicated by the shorter form of the Laird Personal Inventory C-2 test. As far as the ability to follow written directions is concerned, he should do this better than applicants for lower types of work. This may be due to a higher degree of intelligence. An adaptation of the Allport test, eliminating certain situations with an academic background in the form as published, would appear to be useful as one aid in selecting executives and will be given a trial in Cincinnati.

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Industrial Psychology in England, Germany, and the United States[1]

By Arthur W. Kornhauser, *University of Chicago*

While the outlines of industrial psychology were first sketched in this country, the science has had in some of its branches a more rapid growth abroad. Professor Kornhauser's striking picture of the present situation in England, Germany and the United States is drawn from close personal observation. It is a challenge to management and to psychology.

THIS paper is limited to a discussion of certain outstanding features of industrial psychology in England, Germany and the United States. It does not aim to describe the wealth of significant work in progress; that would require several volumes. The attempt is rather to paint with a broad brush those features of the work which appear more or less characteristic and distinctive in the three lands, and to place some interpretation and evaluation on these developments. The treatment represents not a survey of progress in industrial psychology, but rather the lingering impressions left from such a survey. Emphasis is intentionally placed on points of difference between the countries, where each may possibly have most to learn through a consideration of the others' activities. It is scarcely necessary to add that much of what follows is personal opinion.

A difficulty is immediately encountered in the fact that we have so little notion of the proper field to be included in our designation "industrial psychology." At times the term is used rather narrowly to refer only to those technical applications or psychological methods which are included in procedures for selecting men, for training workers, and for increasing efficiency on the job. A far broader definition is often implied which would view as industrial psychology any careful and thorough approach to human nature problems of the business world. More especially, a great variety of non-technical uses of psychology would thus be included—psychological matters, that is, with regard to which the business manager would be his own authority or where he would make his own application rather than calling upon a trained psychologist to solve his problems for him. Viewed in this broader way industrial psychology is concerned with most of the work of the business manager, for few of his problems fail to include significant personal factors toward the solution of which some psychological knowledge or technique of a common-sense sort should be useful. In the present discussion we shall accept this broader view which holds that these ordinary difficulties and activities do all constitute problems of industrial psychology. But primary interest will naturally attach to those problems where analysis and fact-finding have proceeded farthest.[2]

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[1] This paper is based in large measure on observations and study carried on in connection with the writer's activity as a Social Science Research Council Fellow during 1928–1929. He wishes to express his grateful acknowledgment for the opportunities afforded him by the Social Science Research Council.

A further distinction may well be made with respect to the proper field for industrial psychology. The problems are usually talked about from the point of view of the business manager. But in reality the subject-matter constitutes a social science no less than a managerial technique. It is true that in the past most of the writing and research has been in the interests of the individual business unit but this is by no means always the case and in recent years there are many indications that more research of broader social significance is coming to be emphasized in all the countries studied. Even where the psychological work is from a managerial viewpoint, moreover, the results are frequently of general social interest as well.

One further preliminary consideration dealing with the proper field of business psychology should be mentioned. Industrial psychology, we believe, cannot be limited to the territory cultivated by psychologists. This point is particularly significant with regard to the study of work methods and industrial efficiency in the United States. Much of this work is clearly of psychological interest and constitutes an important part of the technique for dealing with human problems in business, even though research and writing have been almost entirely at the hands of engineers rather than psychologists. In the European countries such activities have been much more generally conducted by men with psychological training.

Without further preliminaries let us turn to a brief consideration of some outstanding features of the industrial psychology situation in the United States.

INDUSTRIAL PSYCHOLOGY IN THE UNITED STATES

In terms of what has already been said we can readily understand the paradox to which European observers so frequently call attention, namely that industrial psychology is much farther advanced in the United States than abroad but that in another sense there is extremely little industrial psychology here. The point is, of course, that technical industrial psychology is much less in evidence than is the non-technical, common-sense sort of psychology which runs through all the managerial activities of competent business executives. Moreover, the technical work has been so largely in the hands of engineers that it is rarely identified with psychology. In fact, the number of psychologists giving their full time to research on psychological problems in industry is smaller than Americans care to admit. Probably one can count them all on the fingers of his two hands. In contrast, however, to the small amount of work being done by industrial psychologists, are the extraordinarily wide-spread activities of industrial engineers, efficiency experts, and personnel consultants, and the extensive interest in and use of a semi-scientific practical psychology by business managers.

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[2] In the present paper we shall entirely omit two sets of problems which sometimes are, and sometimes are not, included in industrial psychology—questions of vocational guidance and questions of advertising and selling.

To the extent that psychologists have devoted themselves to problems of industry in this country their research has been preponderantly concerned with psychological tests for employment selection. This type of research received a great impetus during the last part of the World War and during the few years immediately following. Industrial concerns were feeling acutely the need for better adjustment of men to occupations in order to reduce high labor turnover and to decrease inefficiency occurring from poor placement. The widely advertised use of tests in the United States Army focused attention upon the psychological possibilities in this direction. As a result many firms experimented, some thoroughly and some superficially, with the use of these new employment devices. A considerable part of this work was scrapped during the business depression of 1921, but a number of concerns have continued to make use of tests and have proceeded with the experimental development of new testing methods. However, even at the present time the total number of business organizations making any extensive use of psychological tests is very small. Relatively few employers have called upon the psychologist for aid. The great majority have remained unaware of the problem or have believed that present methods are "good enough;" or they are unconvinced that tests are far enough advanced to be profitable or worth experimenting with; or they are fully occupied with what they consider more important problems. The net result is that psychological testing is actively developed in a small number of progressive concerns—but one cannot speak of any general employment psychology movement.

Aside from the work on tests, psychologists have here and there conducted special research studies on problems of fatigue, employee attitudes, training, accident prevention, and the like, but these few pieces of research are so many fragments. They serve only to emphasize the absence of broadly conceived continuing investigations.

But the engineers have done far more than the psychologists. In fact it is largely because of the pervasiveness of industrial engineering that business executives have not felt it necessary or wise to turn to psychologists for help. Under the guiding influence of Taylor and Gilbreth the scientific management engineers for a full generation now have been remaking American production methods in the interests of increasing efficiency. The movement for greater efficiency has directed attention sharply to the human as well as to the non-human elements in industry. With regard to working people and management alike it has meant—at least ideally—optimum methods and conditions of work, more compelling motivation through payment by results, relief from undue strain and fatigue, effective training and supervision. To be sure the followers of Taylor have been freely accused of neglecting "the human element" in industry and beyond doubt the charges have often been well-founded. But since the War most of the active opposition to the scientific management procedures has disappeared, though there is still plenty of feeling to be found in individual plants. In recent years the Taylor Society and The Society of Industrial Engineers have been increasingly emphasizing psychological aspects of their problems. All in all the engineers have accumulated a great amount of information concerning "best" methods of work, effects on efficiency of physical conditions (lighting, ventilation, etc.), and various wage incentive plans. Almost all the studies of these problems have been conducted in terms of the special needs and conditions in particular industrial establishments; they have sought practical results, not scientific generalizations. But as attacks on concrete problems of human efficiency they have been of first rate importance.

If we turn from these lines of work developed by psychologists and engineers, we encounter an almost limitless array of examples of less technical but valuable and thorough work on the human problems of industry. A great deal of what goes under the name of personnel management, labor administration, and industrial relations, is of vital psychological interest and in these fields there has been a great deal of investigating and accumulation of statistical data, for example on problems of labor turnover, absenteeism, accidents and wages. It may well be that from the point of view of human welfare in industry, as well as with respect to industrial efficiency, this looser type of psychological application is more valuable than anything at present possible in the way of technical methods. At any rate it is a type of "psychology" far more prominent in American industry than a more refined psychotechnology.

Perhaps the most characteristic feature of industrial psychology in America is this incorporation into our ordinary management processes of bits of psychological analysis and continuing studies of human data. The American business man is his own psychologist, aided now and then, if he is a progressive business man, by special inquiries which we may, with very little stretching of terms, call psychological studies. We hasten to add that the engineers have shouldered many of the more technical problems and that great ranges of psychological problems continue to exist untouched even in the best managed business enterprises.

At a later point the more distinctive features of the foregoing American picture will be reconsidered in relation to the work abroad.

INDUSTRIAL PSYCHOLOGY IN ENGLAND

Any attempt to appreciate the present position of industrial psychology in England must be based upon an understanding of certain important differences between industrial affairs in that country and in the United States. In the first place the scientific management movement is still only slightly advanced in England. Before the war almost nothing had been done in the way of adopting "American efficiency methods." During the war sporadic efforts were made to increase efficiency by means of the newer techniques but little thorough work along these lines was accomplished. Since the war attention in England has turned more actively to the possibilities of industrial reorganization, as a natural consequence of the very serious conditions in which a large part of British industry has found itself. The international competitive situation has been such that many British industrial leaders have felt that only by adopting large scale efficiency methods could English industry be saved. In many quarters there is still very serious antagonism to the so-called scientific management procedures, both on the part of labor and by the more conservative employers. However, a rather rapidly increasing group of progressive industrialists and also a preponderant number of the powerful trade-union leaders have arrived at a position which is not essentially different from that of the more progressive and enlightened among American industrialists. This does not mean to imply that the Englishman who thinks clearly on these questions comes to the conclusion that salvation lies in imitation of America. Quite the contrary. The best thinking on these matters in England emphasizes the differences between the two countries both on the economic and on the personnel or psychological side, differences which dictate the wisdom of marked changes and adaptations in the application of modern management methods to British industries.

Industrial psychology in England has arisen in the midst of this new interest in improving industry. More accurately, perhaps, it has developed as *part* of the movement. The work in industrial psychology is in large measure an effort to develop efficiency methods adapted to British conditions and British individualism. It is England's substitute for American industrial engineering—with greatly increased emphasis on human values and satisfactions as separable from standards of output and profit, and also with far more interest in scientific studies of broad and basic problems which transcend the practical needs of any particular firm.

A comparison of England with America again calls attention to the great American paradox. The work of industrial psychologists in England is distinctly in advance of that in this country but industrial relations as a whole are clearly less influenced by the "psychological" attitude and approach. Industrial psychology of the less technical sort is far less permeative in British industry. Witness, for example, the striking difference in amount and kind of management literature in the two countries, or the marked contrast in the actual attention given to personnel procedures. While it is true that in both countries independent psychological research and investigations of labor relations are limited to a few progressive firms, there can be no reasonable doubt that American management circles in general are more "personnel-minded." In England one feels far more than in America the presence of clear barriers between management and workers—the remnants of an aristocratic aloofness, at times amounting to a dignified superiority, as over against the more democratic spirit of a rich new land where men of ability have freely risen to positions of authority. That the lines between labor and employers are more sharply drawn in England is a commonplace. What we would emphasize here is that there exists a corresponding psychological difference—distinctly less *understanding* of the worker, less ability and less inclination on the part of the employer to "put himself in the other fellow's shoes," in a word, less application of what we have called non-technical industrial psychology.

British industrial psychology of the more technical sort is carried on almost entirely by two central organizations: the Industrial Health Research Board and the National Institute of Industrial Psychology. A brief characterization of the work of these bodies will accordingly supply a view of the flourishing psychotechnical movement in England.

First, then, the Industrial Health Research Board (until 1929 the Industrial Fatigue Research Board)—clearly the most important organization in the world devoting itself to broad scientific studies in the psychology and physiology of industrial work. The Board is an outgrowth of the Health of Munitions Workers Committee established during the war to protect the health of munitions workers and to increase human efficiency in the munitions plants. The organization is supported by the Government (under the Medical Research Council) and has as its chief aim the conducting of basic research on problems of health, welfare and efficiency in industry. The Board describes its work as falling into three categories:

A. Investigations of particular problems of wide industrial importance.
B. Studies of specific problems submitted by Government Departments and Industrial Associations.
C. Experimental researches conducted in university and other laboratories.

The scope of the work may be more fully seen in the following classification of their published reports (with the titles of one or two reports inserted as samples under each heading):

I. Hours of Work, Rest Pauses, etc.:
  A Comparison of Different Shift Systems in the Glass Trade
  Studies in Repetitive Work With Special Reference to Rest Pauses
II. Industrial Accidents:
  A Psychological Study of Individual Differences in Accident Rates
III. Atmospheric Conditions:
  A Physiological Comparison of Ventilating and Heating Systems in Certain Factories
  The Relation of Atmospheric Conditions to the Working Capacity and the Accident Rate of Miners
IV. Vision and Lighting:
  On the Relief of Eyestrain Among Persons Performing Very Fine Work
V. Vocational Guidance and Selection:
  A Study of Telegraphists' Cramp

The Use of Performance Tests of Intelligence in Vocational Guidance

VI. Time and Movement Study, Occupation Analysis, etc.:
Motion Study in Metal Polishing
Variations in Efficiency in Cotton Weaving

VII. Posture and Physique:
The Physique of Women in Industry (A Contribution Towards the Determination of the Optimum Load)

VIII. Miscellaneous:
Including studies of special industries, research methods, labor turnover and absenteeism, variety and uniformity in work, etc.

In general the investigations and reports of the Board are of the highest quality. Immediate practical aims are consistently subordinated to the demands for careful scientific inquiry. (This is only a trifle less true of category "B" in the above classification than of "A" and "C".) The high standards of work are maintained both as a result of the excellence of the research staff and by reason of the commendable system of critical planning of studies and supervision and editing of reports by scientific committees and special committees (for example, for particular industries) composed of leading British authorities in the fields dealt with. The research staff is composed chiefly of psychologists and physiologists, with one or two engineers and medical men. Among the university investigators (see "C" above) are to be found many of the most prominent British physiologists and psychologists. In view of what has been said it is not surprising to find that the reports reflect a rare scientific spirit and disinterested devotion to the facts which promise much in the way of future results on the problems which the group is attacking.

The National Institute of Industrial Psychology has much more immediately practical aims. The activities of its large and able research staff are devoted almost wholly to the solving of particular problems of individual firms. These investigations are paid for by the concerns for whom they are conducted and the Institute feels obligated to show some returns for the money invested. From the nature of the case less of the work is of scientific significance or of broad general interest. In large measure the work done is identical with that of the industrial engineers in America, although the leaders of the National Institute emphasize the difference between their own point of view and methods and those of the American engineers. Certainly it is true that they have avoided many of the abuses of time and motion study which have been charged against the early disciples of Taylor in this country. And they have steered away from the dangerous (especially in England) problems of wage methods and rate setting. Aside from this, however, it is questionable whether most of their work differs so significantly from that of the more enlightened present day efficiency engineers in the United States. But some advantages do clearly occur as a result of the psychological point of view. Particularly there is far more emphasis upon individual differences and upon ease of work and favorable attitudes toward the changes introduced than one is likely to find in the applications in the United States.

But it would be quite wrong to leave the impression that the National Institute is nothing more than a British adaptation of an American bureau of efficiency engineering. The fact that the staff is composed largely of psychologists with broad theoretical interests in addition to their practical aims would alone prevent this. Moreover, the Institute has intimate cooperative relations with the Industrial Health Research Board and in a very real way is itself a national body (though not governmental) with the prestige and official recognition which that implies. Further, the Institute has from time to time received grants for special research studies of a kind not vastly different from those of the Industrial Health Research Board, though usually more limited. On the practical side, the National Institute has reached into a remarkably large number of industries, has succeeded in gaining the support both of employing groups and powerful labor organizations, and in general is viewed as *the* body concerned with applications of psychology in private industry.

But industry's needs overtower detailed psychological studies. The National Institute has found its work spreading farther and farther beyond what would ordinarily be classed as psychological problems. It is more and more becoming a management research institution. Its staff already includes engineers and accountants and its energies have more and more gone into planning, correct plant layout, managerial organization and so on. In recent years the Institute has been in an extremely difficult position by reason of the pull on the one hand toward general management research and on the other hand toward thorough psychological study. It has been criticized by psychologists for not conducting careful and broadly significant psychological studies and at the same time it has been even more criticized by practical men of affairs because it has spent its time on what appeared to be picayunish problems while far more important problems of business are passed by. Both criticisms are in a measure justified but it is not easy to say what sort of a constructive solution should be adopted. As a matter of fact the Institute seems to be moving more and more in the direction of broad management study which may or may not be psychological, depending on how broad-minded one is in his definition of psychology. Whatever may be the best course for the Institute with respect to the advance of technical applied psychology, there can be little doubt that the present tendency is most in the interest of immediate help to British industry—and it is this latter, apparently, that plays a decisive rôle in the thinking of the leaders of the work.

Aside from these two central organizations there has been a certain amount of industrial psychology scattered among the progressive industrial organizations of the country. In a number of these concerns like Cadbury's and Lever Brothers the attention to human problems has been tied up with rather paternalistic welfare work. In other organizations, most notably Rowntree's, attention has been given to many of the most essential factors of the human problems in industry in a fashion not greatly different from what would be found in the most progressive firms in the United States.

During the past few years there has also been a vigorous attempt to stimulate the interest of industrial leaders in management problems, including personnel problems, on the part of the organizations known as Management Research Groups. While the activity of the members of these research groups is of interest in indicating how some of the more progressive management thinking in England is running, perhaps the very slow growth of this movement and the persistent disinclination of industrial leaders to go too far in exchanging experiences and information is still more significant. There does appear to be considerable truth in the charge commonly made that the ordinary run of British employers is more bound by tradition and less willing to change methods than are typical American business men.

As suggested earlier, it is also true that with regard to the human problems of industry the British executive, by and large, lacks the understanding, insight and fellow-feeling with his employees that is rather common in America. As a natural consequence he is also less inclined to study these problems. And still, paradoxically, here is England far outdistancing the United States in more scientific and technical inquiries in the psychology and physiology of labor. We shall have more to say about this paradox and its significance at a later point—for it obtains with respect to the comparison of Germany with the United States as well as in the case of England. An analysis should be helpful in throwing light on the possible development of psychotechnology in the United States.

INDUSTRIAL PSYCHOLOGY IN GERMANY

In German economic and political discussions there is the same emphasis during these post-war years upon the necessity for increasing efficiency that one finds in England. Far more strikingly than in England in fact, the efforts of industrial leaders are bent toward increasing output and meeting foreign (especially American) competition. Germany is like England too, with respect to the gap separating employers and workers. In Germany, as in England, there is very little of the sympathetic fellow-feeling and understanding between manager and men which we like to think of as characteristic of democratic America.

But in a number of other significant respects Germany is far more like America than like England. There is more of the interest in practical and material results, more willingness to change, more enthusiasm over applied science and technology and, one may add, more admiration of American industrial methods. During the years after the War, German leaders recognized apparently for the first time that American industry constituted a really serious, permanent threat to German supremacy in many fields. It was doubtless with some astonishment that these German leaders came to see that American efficiency was in considerable measure based upon American methods of organization and competence in management rather than being solely a matter of superior natural advantages. As a consequence of this recognition there has been an almost endless stream of German visitors to America, intent upon studying our industrial methods. German employers, German engineers, German students and even German trade-union officials have come to the United States, intent upon discovering the secret of national prosperity. On the whole they have gone back admiring and to some extent willing to imitate; but they have returned, at the same time, critical of our methods—especially on the human side—and certain that American procedures need to be greatly revised before being applicable in Germany.

American scientific management procedures have been subjected to criticism and investigation often more thorough-going than is to be found in the application of these same methods in America. On the matter of conveyor work, for example, which the German engineers and psychotechnologists for a time seized upon as the essence of Ford methods, they soon came to feel the necessity for continued research concerning the conditions under which conveyor work was appropriate and also concerning many details for the effective operation of this method—the speed of the conveyor, the selection of workers fitted for this type of operation, the problem of rhythm of work on the conveyor, the problem of lighting, and so on.

The familiarity with American scientific management literature in Germany is astonishing. Most of the significant American books have been translated and German technical periodicals seem to deal as much with "American methods" or "Ford methods" as do the American journals themselves. In interesting and significant contrast, American literature on personnel management is not well known or readily available. Very few of our books on personnel work and managerial psychology have been published in German. Much of this literature clearly would not directly fit the problems of German employers—but the writer suspects there is far more of value in this material than has been recognized abroad. It is not all "union-busting" and "welfare work."

In Germany, as in England and earlier in the United States, the adoption of scientific management procedures in industry met with considerable opposition from organized labor. While the opposition is still quite vigorous in some quarters, it has become less and less pronounced until at the present time the leaders of the Socialist trade unions are heartily supporting the efficiency movement. At the same time they emphasize the necessity for protecting the welfare of the individual worker and the importance of giving labor its due share in the savings brought by the improved methods.

But all of this is background. What of industrial psychology itself? The answer, in general, is that industrial psychology is much more in evidence, is apparently more important and more sure of itself in Germany than in either England or the United States. This statement refers to industrial psychology as practiced by the psychologists, not as the common-sense managerial psychology of a non-technical kind. The more scientific industrial psychology work of Germany may be further considered in two sections. The first division includes the psychotechnical work; the second consists of studies that may be spoken of as industrial psychology from a social point of view.

German psychotechnical studies do not differ greatly from the type of work done by the National Institute in England or by the better industrial engineers in America. In Germany problems of improvement of working methods and conditions along psychological lines are largely in the hands of engineers but to a considerable extent they are also attacked by psychologists. A number of the engineering schools have connected with them psychotechnical institutes which conduct investigations in industry and which also serve to give psychotechnical training to engineering students. A considerable number of engineering graduates thus go into industry with some fair amount of training in psychotechnical procedures and it is largely the work of these men which is coming to constitute the important body of technical psychological work in industry. This particular method of building up a body of useful knowledge in the field of industrial psychology is distinctly different from that found in England or the United States, and so far as one can judge *a priori* it is a method full of promise. It has all the advantages which come from an attack on the problems by men in industry, familiar in detail with the processes studied and able to deal with the problems as technical engineering undertakings, and at the same time it means that these problems are tackled by men familiar with the technique and point of view of the applied psychologist.

In addition to the work conducted by the institutes of the engineering schools a fairly large number of industries have established research laboratories of their own. The work of these industrial research stations is for the most part concerned with selection and training problems. Germany, far more than the United States or England, has gone forward with the development of psychological tests for various occupations. Testing has come to be especially common for the selection of apprentices in the metal industries and in the selection of workers in the transportation services. It is interesting to note that firms have been willing to adopt testing programs even where they have been disinclined to undertake research with regard to the problems of efficiency on the job, on the grounds that the latter were too uncertain to yield paying results.

Men who have been most prominent in giving direction to the psychotechnical lines of investigation include Moede and Rupp in Berlin, Giese in Stuttgart, Poppelreuter in Bonn, Sachsenberg in Dresden, and many others. In the case of most of these investigators interest in more basic psychological and physiological questions has gone hand in hand with their practical psychotechnical work. Other investigators, notably Atzler on the physiological side and Graf (following the earlier work of Kraepelin) on the psychological side, have conducted valuable continuing research on problems of work and fatigue. The work of these latter men and their associates is now more closely linked to industry and industrial problems through their large and significant new research institute supported in part by employers of the Ruhr district.

Attacks on problems of industrial psychology of broader social interest have been made by a number of individual German investigators. The studies are quite varied in nature. For example, there are the interesting questionnaire inquiries concerning the attitudes of workers toward their work by Levenstein and more recently by DeMan, the extensive and thorough investigations by Lipmann concerning the effects of hours and wages on efficiency, the interpretations of workers' motivation based partly on clinical data by Eliasberg, and the inquiries into the effects of decentralized industry and of smaller as over against larger working groups by Rosenstock, Hellpach and others.

In some ways these latter studies are more interesting as a commentary upon the trend of industrial psychology in Germany than are the more practical psychotechnical investigations although one must certainly consider both if he is to have a fairly adequate picture of what is happening. The broader studies are somewhat more distinctive, however, in view of the fact that so little has been done along these lines in other countries and in view of the fact that these inquiries are reflections of a very much deeper and more wide-spread discussion of the social and individual effects of modern industry than are to be found in England or in the United States.

SOME CONCLUDING COMMENTS

An attempt to summarize in tabular form the chief points of difference among the three countries we have considered would yield something like the following:

United States

Considerable work on problems of "human efficiency" by engineers lacking psychological training

Very little work on industrial problems by psychologists; a trifle more on employment tests than on other problems.

Extensive interest in and use of "common-sense," non-technical psychology by industrial executives; intimate understanding between management and men; prominent development of personnel procedures and point of view; widespread belief that the worker of today may be the manager of tomorrow and that "class" lines are not to be taken very seriously.

England

Considerable progress in the psychological adaptation and application of "efficiency engineering."

Valuable development of research and basic studies in the physiology and psychology of industrial work.

Relatively little emphasis on personnel management or psychological viewpoint and understanding as parts of business administration; less intimate contact between management and men; general acceptance of workingman's status as fixed and "natural."

Germany

Marked progress in the adaptation and extension of "efficiency engineering," with considerable emphasis on analysis of basic factors in addition to immediate practical improvements.

Development of psychotechnical institutes (frequently in engineering schools) and training of engineering students in psychotechnical methods.
Extensive experimental development and practical use of vocational tests.
Lively interest in industrial psychology from a social point of view, with attempts to attack problems of the human effects of modern industrial processes.

The foregoing comparison is not one to occasion great joy in the heart of an American industrial psychologist. Nor should it afford much satisfaction to the far-sighted scientific-spirited industrialist. Our "superiority" is a more or less accidental by-product of our natural wealth and consequent rapid industrial growth with the attendant opportunities for the individual worker and the continual fading out of class lines. Our management of "human relations" is effective and "psychological" largely because of the absence of a class-conscious working population like that of England or Germany. Our retardation in matters psychological, on the other hand, is of our own making. Neglect, lack of interest, and inertia go far to explain our slow progress—and the failure is no less that of the psychologists than that of the business leaders.

As contrasted with England and Germany, we have lacked the strong urge to develop our psychotechnology. The reasons are those already suggested. The general run of human problems are ones where the manager feels competent to do his own "psychologizing;" the more technical difficulties are viewed as problems for the engineer. That there are many questions which the psychologist and physiologist are especially equipped to handle, has rarely been recognized. And the psychologists, finding the factory fences too high to be scaled without great trouble, have typically turned to the laboratory, the school, or the clinic to do their work. At times it has almost seemed as though we were in the absurd situation of having the psychologist pleading: "Give me a chance and I'll show you what I can do," with the industrialist answering: "Show me what you can do and I'll give you a chance."

That the social phases of industrial psychology have been so neglected in the United States—with its millions of dollars for social science research—is more puzzling. It is perhaps true that the European worker is less well off than the American and that social interest in his protection is accordingly more needed. It is true, too, that we are accustomed to leaving the initiative in industrial affairs to the individual management. But in addition, may it not be that we have gradually built up a callousness to the wear and tear of our industrial civilization that has destroyed our sensitiveness to many of its ill effects? In Germany an aggressive, self-conscious, working class movement continually thrusts into the foreground the question: What is industry doing to men? The "new industrial revolution" came more slowly in America and hence with less obvious human consequences; in Germany the strain is more vivid. In England and Germany these influences —and we should include also the desire to conserve human resources and utilize them in a socially or nationally efficient way—have profoundly influenced the thinking and work of psychologists as of other citizens. Consequently many of the most able psychologists abroad have turned their efforts into the paths of industrial psychology. Little of that has occurred in America—and perhaps this is a primary explanation for our lagging behind. But clearly it is not an isolated phenomenon; it reflects the entire difference in the position of industrial psychology in the several countries.

This is not the place to enter into a detailed discussion of what we in America should do. But at least it behooves us to consider and plan. If, as the writer believes, our progress is impeded largely by lack of opportunity for research in industry, and by lack of financial support and effective organization for research and if, in addition, the examples of achievement of such organizations as the Industrial Health Research Board convince us of the importance of the work that can be done—then surely ways and means are to be found. The field of inquiry is one which peculiarly fits the American scene. The problems are all about us everywhere—problems both managerial and social. A nibble here and there is helpful; but large and difficult social problems demand something more than scattered individual efforts. Extensive, persistent, continuing research is needed; research that is likely to come only if we organize to do it.

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Industrial Psychology and Its Development in Switzerland

By Walter J. Heller, *Swiss Federal Institute of Technology*

The origin and growth of industrial psychology in Switzerland offers to other countries a splendid example of cooperation in the development and use of scientific aids to occupational adjustment.

HUGO MÜNSTERBERG, a member of the faculty of Harvard University from 1897 until his death in 1916, was the founder of industrial psychology as a science. At the time that Münsterberg received the call to Harvard, he also received one from the University of Zürich. Despite his going to Harvard, however, the Swiss did not lose interest in him and his theories. For example, in 1913 Mr. Ivan Bally, the manufacturer of the famous Bally shoes, stimulated by Münsterberg's books, called upon the University of Zürich for a man who would introduce Münsterberg's ideas in his factory. The introduction of the technique of industrial psychology was made in this factory by Mr. Jules Suter,—now Professor and Director of the Psychotechnical Institute in Zürich.

A year later, courses in applied psychology were introduced in the University of Geneva by Professor Claparède of the Jean Jacques Rousseau Institute. The technique adopted in Geneva was based on the test method of Binet and Simon, the development of which was taking place all over the world, in Geneva, France, Germany and America.

A NEW TECHNIQUE

Professor Suter was creating a distinctly new method,—another kind of industrial psychology called "the psychotechnical examination." An explanation of this new technique will be given below.

After Professor Suter's work in industry, he returned to the University of Zürich to develop the psychotechnical examination for purposes of selection and vocational guidance. Although he had only a small laboratory in his home in 1919–1920, he established in 1924 an Institute of Industrial Psychology which was sponsored and partially supported by the city. Later the Institute became an independent, self-supporting private institution, which is rather an outstanding achievement for Switzerland.

APPLICATION OF THE PSYCHOTECHNICAL EXAMINATION

The first work done by the Institute is in the fields of selection and vocational guidance, using the technique of the psychotechnical examination. Subjects came from the schools, business, industrial establishments, and private families. The only limitation in the type of case examined were those needing medical attention.

In the first three years the Institute examined 572 cases; 538 cases in 1926; 1038 cases in 1927; 1226 cases in 1928; totaling in all, 3372 cases. As each examination requires half a day or more, this total represents about 20,000 hours devoted to the development of this new kind of industrial psychology.

CONCENTRATION OF INDUSTRIAL PSYCHOLOGICAL RESEARCH

In 1926, Suter and Carrard, especially the latter,—an engineer who had joined the Institute,—proceeded with several investigations, one of which was the reorganization of training methods from a psychological point of view.

In 1927 the Swiss Institutes of Industrial Psychology, especially those in Geneva and Zürich, merged into one corporation called the *Swiss Foundation for Industrial Psychology.* This merger within a science brought together the older psychology, which emphasized the measurement of the separate capabilities, and the more recent technique of studying the total personality. This consolidation has made possible the development of a uniform technique in Switzerland, and instead of scattering its forces, industrial research is concentrating and improving a standard method of procedure.

Further evidences of growth in the interest of industry in this kind of industrial psychology was given by the establishment during that same year of other institutes in Biel and St. Gallen, both of which were approved by the Swiss Foundation for Industrial Psychology. Industry in Switzerland is eager to acknowledge and utilize the economic advantages obtained by this method, for in 1928 we find 80 companies, representing several types of industrial pursuits, gaining assistance from the Institute in Zürich. Important firms like Scintilla Limited in Solothurn are included in this number.

SCOPE OF INDUSTRIAL PSYCHOLOGY, AS UNDERSTOOD IN SWITZERLAND

It is difficult to find a word in English exactly equivalent to the term "psychotechnique." "Industrial psychology" may be an equivalent if we include the fields of scientific management, education, personnel administration, and human relations in industry.

Furthermore, it is difficult to define "industrial psychology" or "psychotechnique" as this science is in a constant process of evolution. Professor Carrard states that industrial psychology "aims to better the psychological condition of labor (mental and practical), and through this to seek to develop the individual welfare and to increase the economical output of human labor."

In order to teach the workman to use his machine, the engineer must know the machine. The same is true for men. If we want to place men in the work for which they are fitted, and if we wish to create and maintain in them an interest in their work, we must know men. This is not a new ideal.

But what industrial psychology aims to do is actually to determine the aptitudes of an individual as a whole, in advance and without sacrificing too much time.

Consequently, for the building up of industrial psychology as a science, there are two important problems to be solved. The first is a scientific one, and consists in finding the tools which will permit us to attain the goal mentioned above. The second, a practical task, is the training of capable psychologists to use these tools effectively.

PRACTICAL APPLICATION OF INDUSTRIAL PSYCHOLOGY IN SEVERAL FIELDS

The Institutes in Switzerland confine themselves to what Münsterberg called the "psychotechnique of economics." That is, their program covers four main fields of activity, namely: (1) selection, vocational guidance, and others, by means of psychological diagnosis; (2) apprenticeship and training; (3) the psychological phase of the scientific management of labor; and (4) the psychological aspects of human relations and leadership.

The psychological examination or diagnosis. We may best attain an understanding of the psychological examination or diagnosis by contrasting it with the test method. A test is a sampling of a performance. Each test is complete in itself. By means of a chosen team of tests, we try to find the chances a given individual has to succeed in the field for which he is tested. The direct summation of these chances reveals whether the subject is qualified or not for the position in question.

The psychological diagnosis, on the other hand, attempts to survey the total personality of the individual. The experiments applied in the diagnosis, wrongly called tests too, are not complete in themselves, but rather form a part of the whole examination. The principles of this technique are, as stated before, to determine the total basic psychological structure of the individual. It consists partly in the measurement of the individual's elementary sensory qualities and his mental apperception and personality as a whole. Further, it covers an investigation into his social background and physical condition. The main emphasis of the examination is to discover only basic qualities,—qualities which become developed fully through everyday life.

The nature of the psychological examination necessitates that it should be individually performed. Unlike the usual test, the time element does not enter, except in the measurement of automatic reaction and dynamic perception.

After a diagnosis of the subject is made, it is verified by follow-up. Instances of incomplete diagnosis have been found, and those in which mistakes have been made in the set-up of the conclusions, but none in which the diagnosis failed in the determination of elementary qualities. Despite the slight possibilities for error in the method, those who use this technique feel that the psychological diagnosis yields at present the most complete and most accurate picture of the individual which we can procure. The conclusions of the diagnosis taken as a whole should be extremely helpful to the personnel manager, the teacher, and the parent.

The rendering of a statement of the basic psychological structure of the individual, however, is only a means to an end. The aim of the method is to advise and select people,—to place them in the work for which they are best fitted. Therefore, the job as well as the individual must be analyzed, work conditions must be scrutinized, and a study must be made of the men already in those jobs. This procuring of the psychological profile of a job is as indispensable for selection and vocational guidance as the psychological diagnosis itself. It is the other side of the problem.

Apprenticeship and training. But it is not sufficient merely to place the right man in the right job. We must further train this man in order to develop in him the best possible work habits and skill. Systematic training constitutes a basic factor in the scientific management of labor. It is of the utmost importance in any country, and especially so in Europe where mechanization in industry is not as advanced as it is in the United States.

It was industrial psychology, with its special technique, which brought relief from the bad apprenticeship and training methods in vogue since the beginning of industry. The three basic prerequisites of training are, knowledge of the trade, a training program, and a knowledge of instructors and apprentices.

The starting point in the setting up of a sound training program is the determination of the basic qualities included in the successful performance of a skilled job. Next, the job must be broken down into its elementary parts to enable the apprentice to perform every motion correctly from the very beginning. This fine analysis of the job avoids the possibility of the apprentice setting up wrong habits which are so difficult to overcome later.

To be successful in the training program, several psychological principles should be followed: (1) to obtain skill, teach only one element of the work process at a time; (2) be very careful to avoid and eliminate all wrong motions; (3) advance in teaching only when the old motions become, to a certain degree, automatic, thus avoiding confusion on the part of the one learning; (4) instruct always in a concrete, clear, and self-evident way; (5) proceed smoothly from one phase of instruction to the next in order to maintain the worker's interest.

These principles are especially important in the first period of training which is the real learning period. The second period in the apprenticeship is especially devoted to what is known in the German language as "training." In this period, the apprentice has grasped the job as a whole, but has still to improve and attain to true skill and speed in his trade. He must be taught to do the job in the best possible way. Various incentives to speed up may be used, e.g., a stimulating wage program. A final step is an analysis of the time the individual wastes in his everyday work.

It is important, in this training period, to create a desire for and a will to attain mastery in his work. Attention is also given to the problem of fatigue, and, by the proper kind of gradual training, to avoid its setting in too soon.

The fundamental principles underlying the art of teaching are the same in every profession all over the world. Its applications vary with varying conditions in different professions and in different countries. In Switzerland, the Institute for Industrial Psychology introduces its technique directly into industries, trades, and crafts. In some machine factories where training departments already existed, the institute reorganized them.

The practical results have been more than satisfactory. In a workshop for locksmith apprentices, for example, a knowledge of the elements of the skill was acquired in two or three weeks. Production in the training department increased 68 per cent. Interest in the work increased, and the workers began to enjoy their apprenticeship. The method found its way even to the city management of Zürich, and was used in the training of motormen, graduate engineers and draughtsmen, and even in banking offices and insurance companies.

For trades such as bricklaying and carpentery, where apprentices were scattered all over the country, the solution was in giving a preparatory course of five to six weeks. In this time apprentices learned the elements of the craft and acquired the skill of the average worker. Consequently, they were used immediately for productive work on the job, and not misused as hod carriers and helpers. Furthermore, contractors were willing to pay higher wages to these new craftsmen. Thus the apprenticeship period no longer smacks of an economic slavery. The success of these bricklaying courses was so great that the Association of Swiss Artisans is about to reorganize the whole system of apprenticeship for all the various trades.

Such phenomenal success would have been impossible without the reports of the psychological examinations which made possible the handling of each apprentice individually and correctly. This point is of the utmost importance as it is the key opening the door to a new training system, efficiently and adequately adapted to the requirements of modern industry.

In summary, the general outlines of this training program consist, first, in building up, with the collaboration of science and practice, a sound training program; second, the selection and teaching of instructors,—the selection and teaching of apprentices or workers; third, the gradual evolution from the preliminary learning period in which one grasps the element of the skill by individual guidance in a separate room, to the training period proper when the worker mixes with skilled workers to perfect his skill, to speed up, and to become a master of his trade.

Scientific management and human relations and leadership. In Switzerland and in other countries of Europe where scientific management and industrial management are in their infancy, the Institute for Industrial Psychology must often start with industrial engineering work preparatory to carrying on its own program. For the psychological part of the reorganization, the psychological examination reports are again required. These are not only for employees, but for managers and presidents as well. The examination of the workers may be done by the psychologist hired by the company. The diagnosis of the higher executives, however, is preferably made in one of the Institutes where expert psychologists are available.

Last but not least, the Institutes devote a great deal of their time to solving the problems of human relations in industry, emphasizing especially the problem of leadership.

PRACTICAL SUCCESS OF THE PSYCHOLOGICAL TECHNIQUE IN INDUSTRIAL SWITZERLAND

The rapid evolution of industrial psychology in Switzerland is due primarily to the economic advantages it yields. Some rather conservative figures may illustrate the extent of its success.

The increase in personal production for people who have been examined, trained, and correctly placed is, on the average, 30 per cent.

The time saved in training workers is about 50 per cent.

The prevention of improper selection of applicants unfitted for a particular job saves about 15 per cent of all the salaries of new comers. There is also a decided decrease in lay-offs of the unfit,—which have usually been kept too long on the job and have been drawing, during this time, an unmerited salary.

There are many other advantages which cannot be numerically expressed, such as diagnosis of the causes of labor disputes; better understanding beteen management and workers; a more reliable means of vocational guidance; and the personal advantage of the examination of the subject himself.

NECESSITY FOR EXPERT HANDLING OF THIS TECHNIQUE

The leaders in industrial psychology in Switzerland, who claim to be able to determine not only a measurement of certain sensory qualities, but the total psychological picture of a man, are aware of the tremendous moral responsibility resting upon their shoulders. A correct psychological diagnosis can be extremely helpful to the subject. A wrong and incomplete statement, on the other hand, may be a serious handicap to the proper development of a man. It is, therefore, of tremendous importance to devote special attention to the selection and training of psychologists for this work. The authors of this sound and accurate method are constantly fighting, and will continue to fight unsound methods of making psychological diagnoses. On the other hand, they undertake the responsibilities of their work with great pleasure, being confident that they can make a real contribution to the community and to the development of their country.

SUMMARY

Briefly, the function of these Institutes consists in educating psychologists in collaboration with the universities and the Swiss Federal Institute of Technology, and developing scientific research in this field. The Institutes proceed in the development of the psychological examination for purposes of vocational guidance and selection. They establish programs for training, and train instructors in these methods. They study problems of scientific management and human relations in industry.

This rapid growth of industrial psychology out of a small laboratory in a suburb of Zürich to the Swiss Foundation for Industrial Psychology, is but a beginning of its development. It is still a young science which, in the process of evolution, will constantly improve itself. In the meantime it is of immeasurable service to its country.

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News Notes

PERSONNEL RESEARCH FEDERATION

Activities of Member Organizations
Boston Elevated Railway

In recognition of its selection as the electric railway which did more than any other in the United States in 1928 "to conserve the safety and health of the public and the employees," the Boston Elevated Railway has been awarded the Anthony N. Brady Memorial Gold Medal. The award is made under the auspices of the American Museum of Safety.

At the time the Personnel Research Federation took over direction of the safety work for this Railway, two fundamental principles were enunciated—

That safety is an integral part of management and not simply something to be taken care of by a special department charged with the administration of safety features only.

That all specific safety efforts must be preceded by and based upon thorough research and investigation into past accidents and their causes. The hit-and-miss, trial-and-error type of safety work, which uses hope in place of cortical energy has been discouraged by this railway.

The report submitted to the jury of award for the Brady medal was prepared by a committee headed by C. S. Slocombe of the Staff of the Personnel Research Federation, who is Safety Adviser of the Railway. It described in detail the efforts made to reduce accidents and the specific methods used, as well as the actual results rewarding these activities. The railway showed an annual average of only 3200 accidents to every ten million miles operated. This is a reduction of 17 per cent in surface car accidents in 1928 compared to 1927 and of 35 per cent in 1928 compared to 1926. Parenthetically, it should be noted that in 1929 there was a further reduction of 12 per cent over 1928. Accidents to employees were reduced by 20 per cent in 1928 compared to 1927.

The management and employees of the Boston Elevated Railway deserve hearty congratulations for their sustained efforts without which these excellent results would have been impossible. Formal recognition of success is fittingly represented by the Brady medal, presentation of which took place February 7 at a meeting of the Metropolitan Section of the American Electric Railway Association in the Engineers' Society Building, New York.

Industrial Health Conservancy Laboratories

The Personnel Research Federation welcomes to corporate membership the Industrial Health Conservancy Laboratories, of Cincinnati. Carey F. McCord, M.D., has been named corporate representative.

The Industrial Health Conservancy Laboratories were organized in 1920 for the purposes of investigative work and routine services in connection with the health of industrial workers. This organization is privately owned, but is not conducted primarily for profit and its activities have become semi-public in character. It is unaligned with any one aspect of industrial interests, such as manufacturing groups, labor organizations, state compensation bureaus, etc.

The principal lines of endeavor embrace occupational disease studies, factory sanitation, general industrial hygiene, physical examinations in industry, training in industrial hygiene for engineering and medical students, and routine day by day services for limited numbers of local industrial plants.

The work is divided into three sections:

1. Scientific research with reference to the incidence, diagnosis and control of industrial diseases. This work is conducted

in part in the field, and in part through laboratory procedures.

2. Advisory services to many Federal and State Departments, medical and other scientific associations, trades associations, insurance companies, etc., in matters related to compensation, unusual individual cases or conditions, expert testimony, editorial work, etc.

3. Day by day case handling in local industries, calling in some instances for the spending of time on the plant premises, and at other times availability for emergencies.

The Industrial Health Conservancy Laboratories are primarily financed through charges made for services to the various interests served. For much of the work conducted, no compensation is derived in view of its public or semi-public character. Inasmuch as technical knowledge of industrial hygiene and of occupational diseases is now limited to very small groups in this country, and in view of the obvious need for a wider dissemination of proper information to industry, compensation boards, and labor and trade associations, it is the general policy of the Industrial Health Conservancy Laboratories to participate in all possible activities contemplating better education in industrial hygiene and occupational disease matters.

JOURNAL OF SOCIAL PSYCHOLOGY

The new Journal of Social Psychology edited by John Dewey and Carl Murchison will not be without interest to readers of the Personnel Journal. The first number, dated February 1930, contains several articles distinctly within the pale of industrial psychology and personnel research.

L. L. Thurstone and T. G. Thurstone present their new "Personality Schedule," which was brought to the attention of readers of the November SERVICE BULLETIN. The neurotic inventory is printed and research incidental to it is described. The Development of Men of Science, a comparison of the starred group in the 1927 edition of *American Men of Science*, and the non-starred group, is the contribution of A. T. Poffenberger. May and Hartshorne espouse the cause of rating scales in Recent Improvements in Devices for Rating Character. Henry F. Adams questions the objectivity of "objective" tests and proceeds to set up criteria of that quality. A marked degree of permanence of interests over a period of a year and a half for two occupational groups is reported in a short article by E. K. Strong.

The Journal of Social Psychology will be published quarterly by the Clark University Press at $7.00 the volume.

ACCIDENT REDUCTION IN CLEVELAND

A beautifully printed brochure called "The Accident-Prone Employee" has been prepared by the Policyholders Service Bureau of the Metropolitan Life Insurance Company. This study of electric railway operation, undertaken by the Cleveland Railway Company in coöperation with this Bureau, is in some respects similar in approach and method to that of the Boston Elevated Railway, described at the New York Congress of the National Safety Council in 1928. The method was that of individual diagnosis of high accident motormen. Fifty of these were selected on the basis of their accident records. In each case operation was observed and accident and service records analyzed. After a decision was made as to the primary causes of accident-proneness, appropriate treatment was recommended. As a result, in the division where the experimental study was carried on, accidents were reduced by 17.21 per cent. One other division showed a reduction of 15.3 per cent during the same period. This is attributed in large part to similar work undertaken at that point by the superintendent after study of the new methods. Accident rates increased in ten of the fifteen divisions.

Among the fifty men diagnosed, "faulty attitude" was the chief cause of accidents. "Failure to recognize potential hazards" and "faulty judgment of speed or distance" are also prominent. "Inexperience" is apparently less significant here than has been found in other studies.

The gratifying results of the experiment have led the company to expand the work as rapidly as possible to the entire property.

Inauguration of a similar program in two other divisions since completion of the study is said to have been rewarded with excellent results.

GILBRETH FATIGUE COMMITTEE

The Society of Industrial Engineers has changed the name of its Committee on Elimination of Unnecessary Fatigue to the Gilbreth Fatigue Committee. This action is very appropriate as a tribute both to the honored first chairman and founder, and to the present Honorary Chairman, Dr. Lillian M. Gilbreth.

EMPLOYEE COÖPERATION IN MANAGEMENT

That granting to employees a share in the management has been an important factor in the growth of one of the largest retail stores in the country, is the conclusion drawn by investigators for the Russell Sage Foundation from an extended study of William Filene's Sons' Company in Boston. This is the fourth in the Foundation's series of studies of sharing management with the workers, but the first in the retail field. Previous studies have dealt with such industries as coal, steel and textiles.

The Filene store was selected for study because of its position as one of the first large organizations in the country to adopt liberal personnel policies. In the Filene coöperative Association, according to the investigators for the Foundation, it formulated one of the earliest, if not actually the original plan of employee participation in management to be set up in the United States. The results of the Filene experiment are examined in this report on the basis of a six-year study by Mary LaDame under the direction of Mary van Kleeck, director of the Department of Industrial Studies of the Foundation.

Commenting on the report, Miss van Kleeck said: "The recent merger of Filene's and R. H. White Company with Abraham & Straus of Brooklyn, F. R. Lazarus & Co. of Columbus, Ohio, and Bloomingdale Brothers of New York, reported as representing combined sales of $106,000,000 a year, gives special significance to this study of the Filene store, which is the largest one in the merger. The unusual feature of the Filene experiment in employee participation is the Filene Coöperative Association, of which every employee is a member and which was designed 'to give its members a voice in their government, to increase their efficiency and add to their social opportunities, to create and sustain a just and equitable relation between employer and employee.' The management believed that this policy would be beneficial to the business and to consumers.

"In actual practice, the Association is allowed to initiate or revise store rules, to determine store hours and regulate vacations, and to govern discharges, transfer of employees or any other condition of employment that might be in dispute. A unique feature is that governing discharge. Any employee who feels himself discharged unjustly can appeal to the Arbitration Board of the Filene Coöperative Association, consisting solely of representatives of his fellow employees. The management is given only a hearing before this Board, and the decisions of the Board are always accepted as final and carried out.

"The fundamental principle of owner management which characterized the store in its beginnings is likely to give way to control through the merger. This raises the interesting question as to what effect a merger of this kind may have upon the relationships between employer and employee in a store which has hitherto been entirely free from absentee control. The owners have been the managers, and they have sought to make the employees their colleagues in work."

The report discusses at some length various welfare and social activities fostered among the employees of the Filene store, some of which were pioneering efforts in employee welfare. Among these have been medical examinations, provisions for sick benefits, a Credit Union for savings and loans, lecture courses, a store publication, store restaurants for employees, social clubs, a band, an orchestra and a choral club.

The personnel of the store numbered about three thousand at the time of the study, of whom more than two-thirds were women. No employee was under sixteen years of age, while 49 were above sixty. Of the total employees in this store, 25 per cent had not finished grammar school, 63 per cent had at least some high school training (16 per cent were graduates) and 2 per cent were college or normal school graduates. Forty-four women and 21 men had been in the store twenty years or more, and in general, women tended to remain longer than men. Three per cent of the women, as against 11 per cent of the men, were listed as being in executive positions. In the sales force, the largest group in the store, nearly three-fourths of the employees received less than $25 on a given week when the payroll was studied. Of these the greater number were women; 86 per cent of the men so employed earned $25 or more. Salaries for office workers were similar, though slightly lower. Of the 145 executives, nearly all earned $40 or more for the week studied, and 25 earned $100 or more.

In the conclusion to their study, the investigators state that the advanced personnel policies of the Filene store have seemed to be a conspicuous success in the building of an efficient and satisfied group of employees. They state, however, that the employees have made little use of some of the rights accorded them. In some other respects, results have not been conclusive, due, according to the report, to lack of persistent education of employees in the rights and privileges granted them.

INDUSTRIAL RELATIONS IN THE METAL TRADES

The National Metal Trades Association has recently submitted to its membership a statistical summary of an exhaustive survey. A booklet entitled Industrial Relations in the Metal Trades, contains in tabulated form detailed information of the 902 plants surveyed. Included are such items as hours normally worked per week, methods of wage payment, methods of employment, and number of employees in the various plants. There is also shown the frequency of occurrence of employee training programs, organized safety work, profit sharing plans, group insurance, employee representation, medical service, suggestion systems and other significant items.

PERSONAL ITEMS

Dr. Helen D. Bragdon has been appointed Dean of the College for Women, University of Rochester. She will take her new post in the Fall of this year, at which time that institution is entering upon an important era of expansion.

It has been announced that Donald Snedden will be added to the staff of the Department of Education, New York University, Washington Square College. Dr. Snedden, who is teaching at Harvard, will take the post of Assistant Professor, specializing in mental testing.

Dr. Don H. Taylor, Assistant Director of the National Junior Personnel Service, has been granted a year's leave of absence, effective January 1, 1930, to become Assistant Director of Industrial Relations for the New York Employing Printers' Association. In his new capacity, Dr. Taylor will be particularly concerned with problems of apprentice selection and training, the development of plans for the projected $2,500,000 education building of the printing and allied trades in New York City and with a survey of the effects of technological changes in the industry on problems of selection, training and employment. Dr. Taylor will continue direction of the study of aptitude tests for the printing trades—the three-year study going forward under the supervision of the National Junior Personnel Service. He will also continue to carry one class as lecturer on personnel administration in the School of Education at New York University.

Dr. A. H. Sutherland, formerly staff member of the Personnel Research Federation, has joined the Personnel Department of the Irving Trust Company, New York.

Book Reviews

Douglas Fryer, *Book Review Editor*

PROFESSOR HOLLINGWORTH AND INDUSTRIAL PSYCHOLOGY

Vocational Psychology and Character Analysis. By H. L. Hollingworth. New York: Appleton, 1929. 404 pp.

Reviewed by Harold E. Burtt, *Ohio State University*

The war years, 1917–18, marked the first extensive use of psychology in practical problems of personnel. The work of the sub-committee of the National Research Council which developed such things as the Army Alpha, trade tests, and tests for aviators, is well known. Hollingworth came on the scene with his interests in vocational psychology somewhat prior to this time. His initial book on the subject appeared in 1916, which puts him rather early in the history of this field, when viewed from a present day point of view. To be sure, Cattell had tried his tests upon Columbia freshmen way back in 1894; Binet had published his scale for measuring intelligence about 1908; a committee of the Psychological Association had developed and standardized the classical Woodworth and Wells Tests, and Whipple in 1910 published his manual giving most of the tests which were at all standardized at that time. Most of this early work, however, involved merely the standardization of tests rather than their use for any practical purpose. Münsterberg was about the only one who had begun to use the tests in any very definite practical way. His application of such devices for the selection of motormen and telephone girls took place between 1910 and 1912. A bit later the Division of Applied Psychology at Carnegie Tech was getting under way. Blackford and the other pseudo-psychologists dealing with character analysis were "going strong." This is about the time that Hollingworth came into the picture. The field was wide open and he was well qualified by a considerable experience in consulting work. His early book, *Vocational Psychology*, in which he recounted some of the pitfalls of the pseudo-psychology and gave some suggestions as to the use of tests and rating scales for practical purposes, went a long way in creating interest in this field and selling it to the practical man and to the psychologist himself. It was for several years the only text for academic courses on this subject.

After the war other works in this field began to appear. Link's book on employment psychology recounted his work at the Winchester Arms. Then there were the two volumes describing the personnel system of the army as organized by the psychological committees and the rather exhaustive tome analyzing the army intelligence tests in their various ramifications. Meanwhile, interest was developing in other types of vocational prediction, notably the measurement of so-called character traits, and also the use of material of a biographical sort, as far as it contributed anything to vocational prognosis. Consequently, in 1922, the time was ripe for Hollingworth's *Judging Human Character*. This dealt with such questions as the reliability and validity of judgments of various character traits made by acquaintances, and also such predictive devices as recommendations, testimonials, and interviews. These techniques while not so objective as tests, still have their rôle and are still functioning in a practical way. Hollingworth's summary of these methods in 1922 was *a propos* and up to date.

The present work combines these two earlier books with a bit added here and there. Practically all the chapters of the original books are included almost verbatim, but in a somewhat different order. In many of the chapters a few pages are added, elaborating some particular point or bringing it down to date. The supplementary material is wisely chosen though brief. There are also two entirely new chapters—one on interest and one on intelligence.

It is scarcely in point to comment on each of these chapters individually, insofar as they are reproduced from the earlier works. Some mention may well be made of new material. The chapter on "Letters of Application" is amplified by a little more detail as to the methods of computing correlation coefficients. The discussion of "Self-analysis" includes some of the more recent analysis schemes, such as those devised by Wells or by Fryer. The consideration of "Measuring Mental Competence" is preceded by a few pages of historical introduction on the general problem of "testing the test." "General Competence and Special Aptitudes" has a few additional pages regarding vocational possibilities for the feeble-minded and also the use of intelligence tests in a few other situations. The chapter on "Moral and Social Traits" is supplemented with brief mention of tests for honesty and deceit. The discussion of "School Curriculum as a Vocational Test" involves reports on two additional studies along these lines, and that on "Psychographic Methods" includes some work on job analysis. The chapter on "Special Vocational Tests" has been to quite an extent rewritten. We have a discussion of the vocational miniature, and the analogy method with recent cases cited by way of illustration. The chapter on "The Sample," *i.e.*, the use of a test which is a sample of the job, includes discussion of some typical trade tests. The chapter on "Vocational Aptitudes of Women" has a few additional introductory pages, setting the thing in its economic perspective. Chapters that stand practically intact are those dealing with: Antecedents of Vocational Psychology, Pseudo-Psychology, Use of Photographs for Predictive Purposes, Recommendations and Testimonials, Interviews, Common Sources of Error in Judgments, Empirical Correlations of Tests.

The chapter on "Interest" is entirely new and follows somewhat conventional lines. We have the question of permanence of interests, and their relation to ability. The techniques for measuring interests are presented briefly, particularly the inventory, or the "like and dislike" devices. Reference is made to a number of the recent studies by Strong and others in this field.

The other new chapter, on "Intelligence," gives data regarding the minimum levels, the typical hierarchy as found in the army test and revised by Fryer, and also some data on similar hierarchies in actual business problems.

The concluding chapter stresses the need for further research. Sixteen exercises follow. These are all duplicates of those in the earlier works, except that new material is provided in one or two instances. A bibliography classified by chapters follows this.

The book as a whole is a worth-while contribution. Most of the material, of course, is available in Hollingworth's two earlier books, but there is some advantage in its presentation in a single volume and of course some of the material in his earlier works is now out of date and needed revision. The combination gives what some scientists will regard as a disproportionate emphasis on subjective procedures such as ratings of one sort or another and not enough stress on the objective test methods. Some of us regard these ratings and biographical items as rather temporary expedients to be used until such time as we can perfect our objective tests for measuring practically all aspects of personality. Hollingworth is a little less sanguine about this program in the immediate future. However he does give a fair statement of things that have been done in the field of vocational tests and the only question would be one of relative emphasis. The present work should be evaluated not entirely on its merits from the present standpoint but in the light of the whole program to which Hollingworth has contributed. His initial efforts were distinctly of the pioneer character, and it is quite fitting to have this later compilation of his points of view regarding this rapidly developing field.

USEFUL JOB-ANALYSIS

The Y. M. C. A. Executive Secretary. By Lester W. Bartlett, Ralph M. Hogan and Alden W. Boyd. Chicago: University of Chicago Press, 1929. xiv + 104 pp.

The Y. M. C. A. Physical Director. By Lester W. Bartlett and Alden W. Boyd. Chicago: University of Chicago Press, 1929. xi + 104 pp.

Reviewed by Richard Stephen Uhrbrock, *Cornell University*

By means of the job analysis techniques perfected by Professor W. W. Charters, two Y. M. C. A. secretaries, and a professor of education in the Y. M. C. A. College, Chicago, have completed two studies that are models of thoroughness. The activities of 21 executive secretaries were studied by direct observation. A trained investigator remained with each secretary for a week. A master list of 503 activities was compiled. Later, this list was checked by 25 experienced executive secretaries. The "dragnet" method was employed in obtaining a list of the activities of physical directors. Fifty-two directors wrote out lists of duties performed. Recollection was stimulated by means of leading questions. The blanks collected contained from 69 to 385 separate activities. A master list of 530 separate activities was compiled. By means of "cross-hatching" 1704 possible functions were stated.

Most job analysis studies have stopped at this point. The contribution of Charters, and his students, has been largely in perfecting techniques for further treatment of such master lists of activities pertaining to specific jobs. In these two studies, activities indicated in the master lists were ranked according to four criteria by executive secretaries and physical directors: "(1) the frequency of performance of the activity, (2) the difficulty of learning to perform the activity, (3) the importance of the activity to efficient conduct of the position, and (4) inclusion in a training course as against learning in service." In addition to master lists, and of more importance for the purposes of curriculum construction, conducting classes in Association schools, and directing upgrading training for men on the job, Bartlett, Hogan and Boyd have stated in tabular form, the duties most frequently, and least frequently, performed by these two classes of workers. Nor is that all. Tables are available showing the 10 per cent of activities most difficult to learn, and the 10 per cent least difficult to learn. The questions of importance of the activity to efficient conduct of the position, and the desirability of inclusion in a training program, have been handled in the same manner. These tables succeed in making the raw data usable.

These two studies are comparable with those in the fields of pharmacy, teaching and librarianship, completed under Professor Charters' direction. They stand as models for future job analysis work, although the authors probably would be the last to claim perfection for them. They are aware of the limitations of their methods, and have suggested the need for repeating their observations at different seasons of the year. One wonders if the duties that make up the master lists would be ranked in essentially the same order if the judges attempted this important task a second time. Since the items composing the master lists were ranked according to four criteria, one is tempted to point out that probably no single group of executive secretaries or physical directors is fully competent to rank the items on all four bases. What constitutes "good judgment," so far as this ranking problem is concerned? We cannot be sure that Y. M. C. A. men who are most efficient in discharging the functions of their separate offices will take all the stimuli into account, and let their judgment be a response to the facts. Neither can we be certain that those who are willing to answer questionnaires and to take the time to rank the items in master lists of duties, have good judgment. Workers in the field of job analysis must face the problem sooner or later of devising a technique that will enable them to isolate able and willing judges to whom data may be submitted for criticism. The practical limitations involved in studying a large vocational group in order to obtain the services of competent judges are very great. To recognize a problem, however, is to progress toward its solution.

INDUSTRIAL COÖPERATION THROUGH ORGANIZATION

Collective Bargaining among Photo-Engravers in Philadelphia. By Charles Leese. Philadelphia: University of Pennsylvania Press, 1929. 220 pp.

REVIEWED BY J. D. HACKETT, *New York*

This is a carefully wrought study of a numerically small but nevertheless important industrial group in which labor represents 64 per cent of the manufacturing cost. It describes a rather successful example of what may be accomplished under trade unionism in shops where the labor is highly skilled and where the degree of organization on both sides is somewhat above the average. About 90 per cent of the workers are affiliated with the unions and about 70 per cent of the employers are members of the "closed shop" association; the greater degree of organization among the workers tends to balance the somewhat stronger position of the employer.

Because of these conditions the process of bargaining has become well integrated and even where agreements have terminated open breaches have been avoided. It is significant that arbitration has not been favored by the workers. Most of the disputes are settled by the employer and the business manager and few go before the Local Joint Industrial Council which is composed of five representatives of each interest, meeting monthly or within five days after a case has been filed. If there is no decision within fifteen days after notice it is then taken up by the Photo-Engravers' Joint Industrial Council.

The photo-engravers have in a large measure gained security and continuity of employment, unusual wage rates, a short work week and control over certain shop practices, all of which have been obtained not only through the operations of a highly organized body of workers but also because of the scarcity of trained labor in an expanding industry. To what extent each of these factors has contributed to the result it is impossible to determine but on the whole it seems clear that while the employer has made concessions not obtained elsewhere he has secured, as an offset, freedom from interruptions of work. The subject matter of the book is well presented and the study as a whole is a very creditable performance.

SELF-GUIDANCE MADE EASY

How to Find the Right Vocation. By Harry Dexter Kitson. New York: Harper, 1929. x + 202 pp. $2.50

REVIEWED BY RICHARD D. ALLEN, *Providence Public Schools*

In this book Dr. Kitson has done a very unusual thing: He has successfully applied his own instruction in the psychology of advertising and salesmanship to his task as an author. His purpose was to write a book which young people would *want* to read, and *read all the way through.* Many books are attractive to handle, but they become prosaic and preachy. This book is attractive to the average secondary school or college youth; he opens it and finds it amusing, interesting, sensible, and real. The author has accomplished his purpose.

These statements are not based upon the opinion of the writer alone. He has tried the experiment of leaving the book where boys would see it. They invariably pick it up, read a chapter or so, and ask where they can get a copy. He has asked their opinions after they have read it and invariably finds that they like it, that it has cleared up many perplexing questions, that they seem to know what they have read, and that they have frequently followed out some of the practical suggestions of the author.

The chapter titles illustrate the author's use of advertising psychology: Instead of "How to *Study* Occupations" (how many boys hate that word!) he has chosen "exploring the Occupations," a title suggesting interesting adventures in an unknown region. The diagrams of *vocational ladders* prove fascinating, with their suggestion of adjustments *within* a vocation as well as *among* vocations. The stress on adjustment as a *continuous process of growth, development, and training,* rather than as a *static condition of inheritance, is a challenge to ambitious youth and old age alike.* There is good salesmanship throughout the book and it seems to have the quality of inciting the reader to effort on his own behalf.

There is much in the book that should be helpful to any adviser, teacher, or parent. It should be useful in secondary school libraries, boys clubs, Y. M. C. A's, scout headquarters, and church schools. It would be hard to find a more practical book to give to any young person as a Christmas or birthday gift. There are doubtless some that are more complete, but this one *will be read.*

There has long been a need for just such a book. One that does not have to be required as a school text book in order to get young people to read it. A place on the reference shelf should be sufficient. It is sensible, sound, attractive, interesting, and clever.

JUNIOR PRACTICALS

The Happy Hour Books. By Charlotte Kuh. New York: Macmillan, 1929. 32 pp. each. Fifty cents each.

Reviewed by Leona C. Buchwald, *Baltimore City Schools*

The six little books—"The Motorman," "The Postman," "The Engineer," "The Fireman," "The Deliveryman," "The Policeman"—in "The Happy Hour Books" series are a real addition to the field of children's literature. They are not occupational studies as we think of them in a technical sense. They are written, rather, in narrative form, but give occupational information incidentally. "The Postman," for example, is built around a child's sending a letter to her grandmother and the grandmother's return of a box of cookies to her. All information concerning the handling of the letter on its way to a distant city is given, together with the names of the workers who figure in the handling. Different types of stamps are explained, and also different types of mail delivery. The story which forms the background holds the interest of the young child. The other books are written on the same plan.

The books present a wealth of general information for children, and at the same time they are the means of introducing them to many workers who figure in the handling of a letter, the story of a train from the time it leaves the roundhouse until it arrives at its destination in a distant city, the delivery of various commodities, and the like.

The illustrations make the books admirably suited for use in the kindergarten, where the children can get the story from the pictures. For good second or third grades the reading material can be used to advantage in social science—geography and civics. Another way in which they would serve an excellent purpose in these grades would be as library material. Children enjoy reading about practical things, things that come within their own experience. Some of the vocabulary is not within the range of the experience of young children, but I feel that the pictures would help in overcoming this difficulty.

These books afford children an excellent opportunity to become familiar with the names of occupations and some of the duties which they carry, from the point of view of general information, and open the way to a more detailed and serious study of occupations which may follow in the upper grades.

Earnings and Working Opportunity in the Upholstery Weavers' Trade in 25 Plants in Philadelphia. By Anne Bezanson. Philadelphia: University of Pennsylvania Press, 1928, 131 pp.

This study undertakes to determine the economic status of the workers from weekly reports furnished by individual weavers over a period of two years. There is a difference in average hourly earnings between the lowest and highest shop of 22 cents per hour in 1926 and 25.7 cents per hour in 1927. Less than two per cent of the full-year workers, and ten per cent of short-service employees, earned less than 70 cents per hour. A wide range of weekly earnings exists, with a difference between highest and lowest of as much as ten or twelve dollars per week. The difference in wages between plants tended to promote turnover, and illustrates the difficulty of determining the "going wage" which is so frequently depended upon for establishing an equitable figure.

BRIEFER MENTION

The Jews in the United States, 1927. A Study of Their Number and Distribution. By Harry S. Linfield. New York: Amer. Jewish Com., 1929, 111 pp.

In the first detailed census of the distribution of Jews in the United States it is found that there are Jews living in every city of 25,000 or over, in 90 per cent of the urban places of 25,000 or less, in 30 per cent of the rural villages of 2,500 or less, and in 7 per cent of the rural unincorporated areas. Jews form 11.11 per cent of the total population in cities of 100,000 or over, 3.11 per cent in cities of 100,000 to 25,000, and 1.61 per cent in cities of 25,000 to 10,000. Of a population of 5,970,800 in New York City, 29.56 per cent, or 1,765,000, are Jews. Forty-four per cent of the Jews in New York City live in Brooklyn, and about half of the Borough of Bronx are Jews. With the exception of large cities, the density of Jewish population is extremely light. This canvass, made at the end of 1927, showed that 4,228,029 Jews lived in the United States, comprising 3.58 per cent of the entire population. This number increased from 3,388,951 in 1927, which was 3.27 per cent of the population. In New York State 16.67 per cent of its population, or 1,903,890, are Jews, which is 10 per cent more than that of any other State. There are 3 per cent or more of Jewish population in Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, New Jersey, Delaware, Maryland, Ohio, and Illinois.

The Soviet Union Looks Ahead: The Five-Year Plan for Economic Reconstruction. New York: Liveright, 1929, xii plus 275 pp., $2.50.

In this official program, the Planning Commission of the Union of Socialist Soviet Republics presents a detailed plan for the industrialization of Russia. Each industry has been studied, and for each one, the Commission has determined which of the existing facilities shall be enlarged and improved, where new plants shall be located, how much capital shall be expended, where the raw materials shall be obtained and the products marketed, and how the labor shall be trained and recruited. Considerations of personnel occupy three of the ten chapters. In order to prepare the workers for the new age, it is recommended that American and European methods of vocational guidance be adopted.

Economic Resources and Industries of the World. By Isaac Lippincott. New York: Appleton 1929. xxii plus 656 pp.

After a general description of international trade, its mechanism and function, the book proceeds to a detailed discussion of economic resources, classified first by commodities, and secondly by countries. Bibliography, maps, and questions for students, are included.

The Psychology of Happiness. By Walter B. Pitkin. New York: Simon & Schuster, 1929, 410 pp.

Happiness, according to the author, is not due to a single trait, but to a subtle principle of combination of whatever traits the individual may possess, regardless of the level of intelligence, constitutional force, or life's objectives. This conclusion is based upon character studies after the form of a psychoanalysis turned into a theory of behavior patterns.

The A B C of Nerves. By D. F. Fraser-Harris. New York: Knopf, 1929, 219 pp.

This book is a popularized exposition of the essential facts about the nervous system, its anatomy and physiology. There are readable chapters on the neuron theory, reflex action, the higher "centers," cortical localization, phrenology, pain, sleep and dreams, and the physical basis of consciousness. Chapter I, on The Preëminence of the Nervous System, rhapsodizes at length about "this overseer of all parts of the body" and undertakes to demonstrate its "nobility" and its "functional superiority." In proof of this, the alleged fact is cited that in prolonged starvation, the nervous system is the last to be affected: "Such is the inexorable necessity of the higher, that the lower systems actually give themselves up to feed this master-tissue." The author believes in mental telepathy and in the possibility of the telephatic causation of prophetic visions in dreams; among other things of a similarly questionable nature, he regards the hypothesis of the inheritance of ancestral memories as being "by no means extravagant."

Applied Electrocardiography. By A. E. Parsonnet and A. S. Hyman. New York, Macmillan, 1929, xxv plus 206 pp., $4.00.

A manual which brings the theory and application of electrocardiographic technique up to date. It includes descriptive data not obtainable elsewhere on recent models of the electrocardiograph, and evaluates the respective advantages of these new instruments.

You and Your Children. A Book for Catholic Parents, Priests, and Educators. By P. H. Furfey. New York, Benziger Brothers, 1929, ix + 180 pp., $1.50.

This book aims to combine Catholic teachings and principles of child care in a common-sense statement, which is illustrated in the following: "The child who is sent . . . . to bed on the appearance of every minor ill and who is waited upon indulgently at every ache or pain, is being taught to become a neurotic adult . . . . Let him be taught to admire the lives of the saints and martyrs who were glad to suffer in the cause of Christ." Simple discussions of psychological problems of education, such as those of the gifted and feebleminded child, are included. Case illustrations add to the reading interest. Books for parents are recommended, with the statement that "the modern non-Catholic literature on child study must, of course, be read with certain caution," and a glossary of technical terms is included.

New Books

LABOR RELATIONS

ANDERSON, GEORGE. *Fixation of Wages in Australia.* New York: Macmillan, 1929. 568 pp. $8.50.

CLAY, HENRY. *The Post-War Unemployment Problem.* New York: Macmillan, 1929. 218 pp. $3.40.

COOM, CHARLES S. *Maximum Wages, the Foundation of Prosperity.* Boston: Meador Publishing Company, 1929. 226 pp. $2.50.

LYTLE, CHARLES W. *Wage Incentive Methods.* New York: Ronald Press, 1929. 464 pp. $7.50.

OCCUPATIONAL ANALYSES

WILLIAMSON, MARGARETTA. *The Social Worker in Group Work.* New York: Harper, 1930. 258 pp. $2.50.

MENTAL TESTS AND USES

PATERSON, ELLIOTT, AND OTHERS. *Minnesota Mechanical Ability Tests.* Minneapolis: University of Minnesota, 1930. $5.00.

ROCK, ROBERT T., JR. *A Critical Study of Current Practice in Ability Grouping.* Washington, D. C.: Catholic Education Press, 1929. 132 pp. Paper. Apply.

SCHWEGLER, RAYMOND ALFRED. *A Study of Introvert-extravert Responses to certain Test Situations.* New York: Teachers College, Columbia University, 1929. 188 pp. $2.00.

SCOTT, ADELIN WHITE. *A Comparative Study of Responses of Children of Different Nationalities and Environments of Intelligence and Achievement Tests.* New York: Teachers College, Columbia University. 30 pp. $1.50.

SMITH, GALE. *How to Construct and Use Non-Standardized Objective Tests.* Fowler, Indiana: Benton Review Shop, 1929. 168 pp. $1.50.

SWEET, LENNIG. *Personal Attitudes Test for Younger Boys.* New York: Association Press, 1929. Paper. $2.00.

GUIDANCE

ANGELL, ROBERT COOLEY, ed. *A Study in Undergraduate Adjustment.* Chicago: University of Chicago Press, 1930. 173 pp. $2.00.

BRAGDON, HELEN DALTON. *Counseling the College Student.* Cambridge, Massachusetts: Harvard University Press, 1929. 173 pp. $2.50.

WOODHOUSE, CHASE GOING, AND YEOMANS, RUTH FRANCES. *Occupations for College Women.* Greensboro, North Carolina: North Carolina College for Women, 1929. 290 pp. $2.00. Paper, $1.00.

MENTAL HEALTH

LEE, PORTER R., AND KENWORTHY, MARION E. *Mental Hygiene and Social Work.* New York: Commonwealth Fund, Division of Publications, 1929. 309 pp. $1.50.

WHITE, WILLIAM ALSON. *Outlines of Psychiatry.* Washington, D. C.: Nervous and Mental Disease Publishing Company 1929. 452 pp. Fab. $4.00.

MANAGEMENT AND ADMINISTRATION

BLACK, JOHN DONALD, AND BLACK, ALBERT G. *Production Organization.* New York: Henry Holt, 1929. 657 pp. $3.75.

GILBERT, HORACE N., AND GRAGG, CHARLES I. *An Introduction to Business.* New York: McGraw-Hill, 1929. 386 pp. $3.00.

HAYES, MONARD V. *Accounting for Executive Control.* New York: Harper, 1929. 511 pp. $6.00.

HESS, HERBERT WILLIAM. *Creative Salesmanship.* Philadelphia: Lippincott, 1929. 339 pp. $3.50.

LYON, LEVERETT SAMUEL. *Hand-to-mouth Buying.* Washington, D. C.: Brookings Institute, 1929. 502 pp. $4.00.

INDUSTRIAL EDUCATION

ALEXANDER, THOMAS, AND PARKER, BERYL. *The New Education in the German Republic.* New York: John Day, 192-9 415 pp. $4.00.

Dyde, W. F. *Public Secondary Education in Canada.* New York: Teachers College, Columbia University. 272 pp. $2.50.

James, Gorton. *Prison Industries.* Washington, D. C.: Government Printing Office. 143 pp. Paper. 20¢.

Pinkevitch, Albert P. *The New Education in the Soviet Republic.* New York: John Day, 1929. 416 pp. $4.00.

Proffitt, Maris M. *Industrial Education.* Washington, D. C.: Government Printing Office, 1929. 25 pp. Paper. 5¢.

Who's Who in American Education. New York: Robert C. Cook Company, 1929. 735 pp. $10.00.

Woody, Thomas. *A History of Women's Education in the United States.* New York: Science Press, 1929. 2 volumes. 624 pp.; 658 pp. $10.00.

VOCATIONAL INFORMATION

Allen, Charles Laurel. *The Journalist's Manual of Printing, with Laboratory Exercises.* New York: Nelson, 1929. 277 pp. $3.75.

Avram, M. H. *The Rayon Industry.* New York: Van Nostrand, 1929. 916 pp. $12.00.

Eaton, Theodore H. *Principles in Making Vocational Course of Study in Agriculture in High School, Objectives, Procedure, and Criteria to Be Observed.* Washington: Government Printing Office. 26 pp. Paper. 5¢

Eckles, Clarence H., and others. *Milk and Milk Products.* New York: McGraw-Hill, 1929. 375 pp. Buck. $7.50.

Daniels, Joseph. *Iron and Steel Manufacture in Washington, Oregon, California and Utah.* Seattle, University of Washington, 1929. 69 pp. Paper. 65¢

Duddy, Edward Augustin. *The Cold-Storage Industry in the United States.* Chicago: University of Chicago Press, 1929. 121 pp. $2.00.

Hedden, W. P. *How Great Cities Are Fed.* Boston: Heath, 1929. 318 pp. $2.80.

Johnson, J. B. *Airplane Welding.* Chicago, Illinois: Goodheart-Willcox, 1929. 321 pp. $3.50.

Trade Foundations Based on Producing Industries. Peoria, Illinois: Manual Arts Press, 1929. 541 pp. $3.75.

Wilson, John Arthur. *The Chemistry of Leather Manufacture.* New York: Chemical Catalog Company, 1929. 630 pp. $10.00.

PSYCHOLOGY

Appelt, Alfred. *Stammering and Its Permanent Cure.* New York: Dutton, 1929. 227 pp. $2.25.

Boring, Edwin Garrigues. *A History of Experimental Psychology.* New York: Century, 1929. 715 pp. $4.00.

Bridges, J. W. *Psychology: Normal and Abnormal.* New York: Appleton, 1929. $3.50.

Conklin, Edmund Smith. *The Psychology of Religious Adjustment.* New York: Macmillan. 354 pp. $2.50; Textbook Ed. $2.00.

Conrad, Herbert S., and Jones, Harold Ellis. *Psychological Studies of Motion Pictures.* Berkeley, California: University of California Press, 1929. 38 pp. Paper. 50¢.

Dunlap, Knight. *Influence of Habit on the Faculty of Thinking.* Baltimore, Maryland: Williams & Wilkins, 1930. $6.00.

Elliott, Merle Hugh. *The Effect of Appropriateness of Reward and of Complex Incentives on Maze Performance.* Berkeley, California: University of California Press, 1929. 6 pp. Paper. 25¢.

Ewer, Bernard C. *Social Psychology.* New York: Macmillan, 1929. 445 pp. $2.25.

Farley, Albert Allison. *The Psychology of Teaching.* Eshkosh, Wisconsin: Author, 1929. 228 pp. $1.60.

Fearing, Franklin. *Reflex Action.* Baltimore, Williams & Wilkins Company, 1930.

Myers, Charles S. *Psychlogical Conceptions in Other Sciences.* New York: Oxford University Press, 1929. 24 pp. 70¢.

Scott, Walter Dill. *Psychology of Advertising.* New York: Dodd, Mead, 1930.

Stekel, Wilhelm. *Sadism and Masochism.* New York: Horace Liveright, 1929. $10.00.

Tegarden, Hollis. *Why Do We Do As We Do?* Boston: Badger, 1929. 231 pp. $2.00.

ECONOMICS

Brookings, Robert Somers. *Economic Democracy.* New York: Macmillan. 179 pp. $1.50.

Bukharin, N. *Economic Theory of the Leisure Class.* New York: International Publishers. $1.50.

Bukharin, Nikolai. *Imperialism and World Economy.* New York: International Publishers, 1929. 173 pp. $2.00.

Carpenter, William S. *Development of American Political Thought.* Princeton, New Jersey: Princeton University Press. $2.50.

Florence, Philip Sargant. *The Statistical Method in Economics and Political Science.* New York: Harcourt, Brace, 1929. 545 pp. $7.50.

Hughes, Ray Osgood. *Fundamentals of Economics.* Boston: Allyn and Bacon, 1929. 523 pp. $1.80.

Page, Kirby. *New Economic Order.* New York: Harcourt, Brace, 1930.

Price, Hereward T. *Economic Dictionary.* New York: G. E. Stechert, 1929. 676 pp. $9.00.

Robinson, Leland Rex. *Investment Trust Organization and Management.* New York: Ronald Press, 1929. 608 pp. $7.50.

Scheifley, William H. *Aspects of European Economics and Reconstruction.* Los Angeles, California: Wetzel Publishing Company, 1929. 310 pp. $4.00.

Spann. *History of Economics.* New York: Norton, 1930.

PHILOSOPHY

Durham, James H. *Principles of Ethics.* New York: Prentice-Hall, 1929. 570 pp. $3.00.

Kelton, Aryan. *Power of the Universe.* New York: America-India Publishing Company, 1929. 240 pp. $10.00.

Roemer, William Francis. *The Ethical Basis of International Law.* Chicago: Loyola University Press, 1929. 203 pp. $2.50.

Thomas, Milton Halsey, and Schneider, Herbert Wallace. *A Bibliography of John Dewey.* New York: Columbia University Press, 1929. 172 pp. $3.00.

SOCIOLOGY

Gates, Reginald Ruggles. *Heredity in Man.* New York: Macmillan, 1929. 398 pp. $6.00.

Glueck, Sheldon and Eleanor. *Five Hundred Criminal Careers.* New York: Knopf, 1930. $5.00.

Puckett, Hugh W. *Germany's Women Go Forward.* New York: Columbia University Press, 1930.

Smith, Thomas and White, Leonard, eds. *Chicago.* Chicago: University of Chicago Press, 1929. 294 pp. $3.00.

Taylor, Graham. *Pioneering on the Social Frontier.* Chicago: University of Chicago Press, 1930.

Wissler, Clark. *An Introduction to Social Anthropology.* New York: Holt, 1929. 402 pp. $3.50.

Current Periodicals

Prepared by Linda H. Morley, *Industrial Relations Counselors, Inc.*

BONUS SYSTEM

Miller, Robert F. (Industrial Engineer, Stevenson, Harrison & Jordan). Paying quality premiums. *Factory and Industrial Management.* December, 1929, Vol. 78, 1346–1347.

Details of administration of a piece rate system in the welding department of a large chain manufacturing concern. Three forms are reproduced.

EMPLOYEE REPRESENTATION IN MANAGEMENT

Aresty, Julian G., and Miller, Gordon S. Technique of arousing and maintaining the interest of foremen and workmen in plans of employee representation. *Personnel,* February, 1930, Vol. 6, 115–132.

Analysis of ten methods used to maintain interest of the foremen and employees, as employed by a number of companies to whom questionnaires were sent.

A Wharton School, University of Pennsylvania, study.

EMPLOYMENT—STATISTICS

Snow, E. C. Limits of industrial employment; with discussion. *Royal Statistical Society Journal*, 1929, Vol. 92, part 3, 323–373.

The author points out certain facts which he thinks afford a partial explanation of the inability of the industries of the country to absorb the labor available. The relation of population age to the problem is discussed, and elaborate tables by age groups are used in illustration of the facts.

EXECUTIVES

Batt, William L. (President, SKF Industries). Duties of a chief executive in a business of moderate size. *Management Review*, December 1929, Vol. 18, 399–405.

Assigning responsibilities of the chief executive; Adequate executive operating structure; Chief executive's functions in the organization; Results from coöperation; Developing hearty team spirit; Encouraging independent organization thinking; Personal position of business head; Actual duties of chief executive; Recruiting new executive material; Test of organization functioning; Measure of success of chief executive.

INCOME STATISTICS

National Bureau of Economic Research. Shifts in income concentration. *News Bulletin, National Bureau of Economic Research*, November 8, 1929. No. 34, 1–4.

The Bureau is beginning to release statements of some of the conclusions reached in their study of income distribution in the United States which has been under way for several years. Charts and tables show relative changes and amounts of per capita income in the four income classes from 1916 to 1926, both in current and in 1913 dollars.

INDEX NUMBERS

United States—Federal Reserve Board. Revised indexes of factory employment and payrolls. *Federal Reserve Bulletin*, November, 1929, Vol. 15, 706–716.

Prepared by Aryness Joy of the Division of Research and Statistics, William Berridge, and Woodlief Thomas. Includes the indexes themselves together with a description of the data underlying them and of the methods used in their construction.

INDUSTRIAL RELATIONS

Houston Electric Company. Houston Electric Company's recovery a triumph of personnel relations. *Aera*, November 1929, Vol. 20, 651–657.

The company's safety program, educational plans, coöperative association, and insurance scheme are outlined.

Sheldon, Arthur F. Human engineering. *Society of Industrial Engineers Bulletin*, September 1929, Vol. 11, 17–24.

Selection, instruction, care of health, safety of labor, control and supervision of labor.

Slichter, Sumner H. Current labor policies of American industries. *Quarterly Journal of Economics*, May, 1929, Vol. 43, 393–435. (Abstract in *Social Science Abstracts*, December 1929, Vol. 1, 1475.)

Points out the danger of paternalism to workers. Six policies of management in their relations to employees are commented on.

JAPAN

Gilbreth, Lillian. (President, Gilbreth, Inc., Vice-President, American Management Association). Impressions of industrial Japan. *Personnel*, February 1930, Vol. 6, 110–115.

Running comment on the experiences of a delegate of the American Management Association to the World Engineering Congress.

LABOR LEGISLATION

Andrews, John B. Major issues in labor law administration. *American Labor Legislation Review*, December 1929, Vol. 19, 337–341.

Financial problem. Administrative order. Effective inducements and penalties. Better administrators.

Labor legislation of 1929. *American Labor Legislation Review,* December 1929, Vol. 19, 417–471.

Includes a subject index. Labor laws enacted by the 44 states, two territories and two insular possessions which held regular sessions and those that held special sessions, together with the labor laws enacted by the 70th Congress, 2d session, summarized in alphabetical order by subjects and by states, with chapter references to the session law volumes.

LOANS

Merchants' Association—Industrial Bureau. Association surveys company loan plans. *Greater New York,* January 22, 1930. Vol. 17, 3–4.

Thorough Industrial Bureau report is made showing that many employers provide means whereby their employees may obtain money needed to meet emergencies —borrowings in two years are placed at $2,000,000. Covers 182 concerns.

MACHINERY IN INDUSTRY

Brown, A. B. Machinery: a blessing or a curse. *Hibbert Journal,* October, 1929, Vol. 28, 1–12.

The main evils associated with modern mechanization and the resulting mass production follow not from machinery itself, but from the use of it. The actual cause of the evil is profit-making on the part of the producer, and lack of taste on the consumer's side. The decline in standards cannot be charged to machine production, but rather to the consumption of products.

MENTAL HYGIENE

Campbell, C. M. Personal factors in relation to the health of the individual worker. *Mental Hygiene,* July, 1929, Vol. 13, 483–495.

Several case studies are related to show the importance of recognizing the personal and emotional origin of physical symptoms in the treatment of ill-health.

Elkind, H. B. Industrial psychiatry. *Mental Hygiene,* April, 1929, Vol. 13, 378–392.

Numerous case studies are used to illustrate the importance of psychological and physiological factors in management. The importance of psychiatric training for industrial physicians is stressed. Work of R. H. Macy and Company, along these lines, is cited.

Viteles, Morris S. Psychology and psychiatry in industry; the point of view of the psychologist. *Mental Hygiene,* April 13, 1929, Vol. 2, 361–377. (Abstract in *Social Science Abstracts,* December 1929, Vol. 1, 1477.)

Review of the contributions of psychology to industry.

NEW ENGLAND—ECONOMIC CONDITIONS

McGraw-Hill editors study New England; list favorable and unfavorable factors in area after detailed study of conditions. *Providence Magazine,* December 1929, 484–487.

OCCUPATIONS

Ginsberg, Morris. Interchange between social classes. *Economic Journal,* December 1929, Vol. 39, 554–565.

The author measures the degree of movement between social classes, by a preliminary inquiry based on groups indicated by mode of occupation, on the ground that from these may readily be inferred a person's mode of life and educational standing and therefore his social class. The separate classes treated are, professionals, salaried workers, wage-earners.

Retail Credit Company. Artificial leather. *Industry Report,* December 1929, Vol. 4, 1–8.

A classification of jobs in this industry. Index to occupations and potential hazards of each.

PSYCHOLOGY

Hersey, R. B. Cycles in workers' efforts and emotions. *Engineers and Engineering,* July 7, 1929, Vol. 46, 162–166. (Abstract in *Factory and Industrial Management,* December 1929, Vol. 78, 1371.)

Results of study of 17 men in one plant to find out relationship of their inner thoughts, feelings and emotions to happiness and efficiency while at work. Address before Engineers' Club of Philadelphia.

Stevens, S. N. Psychology of handling men. *Railway Mechanical Engineer*, October 1929, Vol. 103, 611–614. (Abstract in *Factory and Industrial Management*, December 1929, Vol. 78, 1371.)

General description of specific problems; individual characteristics must be studied; levels of ability vary widely; efficiency impossible without satisfaction; objective incentives alone not sufficient.

RATING

Marsh, C. A. How Gimbels study and rate employees. *System*, August 1929, Vol. 3, 29–31.

The company's rating plan provides for semi-annual gradings on each employee, and enables it to easily identify persons set for advancement, and put "time-servers" in a group by themselves. Several records are illustrated.

SAFETY

Dublin, Louis I. Job and the life span. *Harper's Monthly Magazine*, January 1930, Vol. 160, 239–248.

Relative safety of different occupations discussed.

Union Carbon and Carbide Corporation. How safe is an office worker? *Carbidea*, January 1930. Vol. 6, 7–8.

Accident report shows higher frequency rate for employees of the general offices than for factory workers.

SALARIES

Salary differentials in case of transfer to New York City. *Service Letter on Industrial Relations*, December 5, 1929. No. 47, 2–3.

Experience of 30 companies epitomized. One statement reads, "We consider a 25 per cent advance as a fair standard by which to measure the increase." Includes a standard of living figure for New York City as compared with four other cities.

SOCIAL INSURANCE

Cohen, Joseph L. Incidence of the costs of social insurance. *International Labour Review*, December 1929, Vol. 20, 816–839.

Analysis of the elements which the author thinks are the determining factors of the effect of the incidence of costs of social insurance on national income. Includes a discussion of the influence of systems of insurance within a specific country, and the resulting transference of risks as between prosperous industries and those in a less favorable situation.

TESTS

Chipman, C. E. Correspondence of school achievement and industrial efficiency with mental age as obtained by the Stanford-Binet. *Psychological Clinic*, March 1929, Vol. 18, 21–28.

A case study of two boys of opposite temperaments, with the same mental capacity to show the lack of any means of predicting on the basis of environment or social reactions, the reliability of mental age as the measure of future academic or industrial success.

Viteles, Morris S. (Ph.D.; Assistant Professor of Psychology, University of Pennsylvania). Psychological methods in the selection of policemen in Europe. *Annals of the Academy of Political and Social Science*, November 1929, Vol. 146, 160–165.

German, Austrian and Russian practice discussed. Methods not described in detail. Techniques used in Berlin are the ones most frequently referred to.

UNEMPLOYMENT

Leeds, Morris E. (Leeds and Northrup Co.). Program for decrease of unemployment in Philadelphia. *American Labor Legislation Review*, December 1929, Vol. 19, 376–379.

Summary of a report made by the Industrial Relations Committee of the Philadelphia Chamber of Commerce. Seven specific recommendations are made.

Sells, D. M. What is unemployment? *Hibbert Journal*, July, 1929, Vol. 27, 720–735.

Unemployment is the result of the lack of coördination between capital, labor and raw materials. The trade cycle is a cause of unemployment. The obvious treatment then is to clear up the condition producing the exaggerated ups and downs of business and the major part of unemployment will disappear. Rules for equilibration are set forth by the author.

UNEMPLOYMENT INSURANCE

Carroll, Mollie, Ray (Goucher College). Two years of German unemployment insurance. *Social Service Review*, December 1929. Vol. 3, 563–568.

VACATIONS

Timmons, Benjamin F. Employe vacation plans among Ohio industries. *Bulletin of Business Research*, *Supplement*, November 1929, Vol. 4, 1–4.

This is the report on the survey made by the bureau.

VOCATIONAL GUIDANCE

Viteles, M. S. Validating the clinical method in vocational guidance. *Psychological Clinic*, May, 1929. Vol. 18, 69–77.

A statistical study to determine the extent to which the individual has been helped through the application of the clinical method in "preparing for, entering upon, and progressing in a vocation." The facts reported are suggestive of the value of the clinical method, and of the importance of future follow-up studies of this type.

WAGES

Richardson, J. H. (Ph.D.; Research Division, International Labour Office). Doctrine of high wages. *International Labour Review*, December 1929. Vol. 20, 797–815.

Wage determination is the most fundamental and difficult problem in industrial relations, involving both the prosperity of industry and the standard of living of workers. Demands in wage advances are often countered by the argument that they will result in business depression and unemployment. But in many countries the levels of real wages have risen while industrial prosperity has been maintained or even increased. During recent years the rise in real wages in the United States has been so great with continued unparalleled prosperity as to lead to the wide adoption of the doctrine that high wages are essential to economic progress. The purpose of the present article is to examine the basis and implications of this much discussed doctrine, with special reference to post-war developments in the United States.

Wages and hours of work in the coal mining industry in 1927. *International Labour Review*, October 1929, Vol. 20, 539–562; December 1929, 840–855.

Report of an inquiry made by the International Labour Office. Statistics for eight European countries are given.

WAGES—PAYMENT METHODS

Methods of wage payment in 893 industrial companies affecting 502, 273 employees. *Iron Trade Review*, November 28, 1929, Vol. 85, 1427.

Statistical analysis by industries, in chart form. A graph illustrates the effects of the adoption of incentive plans on manufacturing costs and on employee earnings.

Payment for overtime office work. *Service Letter on Industrial Relations*, January 5, 1930, No. 49, 3–4.

Practice of 26 large companies in New York City.

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